

Clearing the Air Part 2:

The Hockey Stick Controversy, the Climatic Research Unit Emails, and What They Mean for Climate Science

Jason E. Smerdon

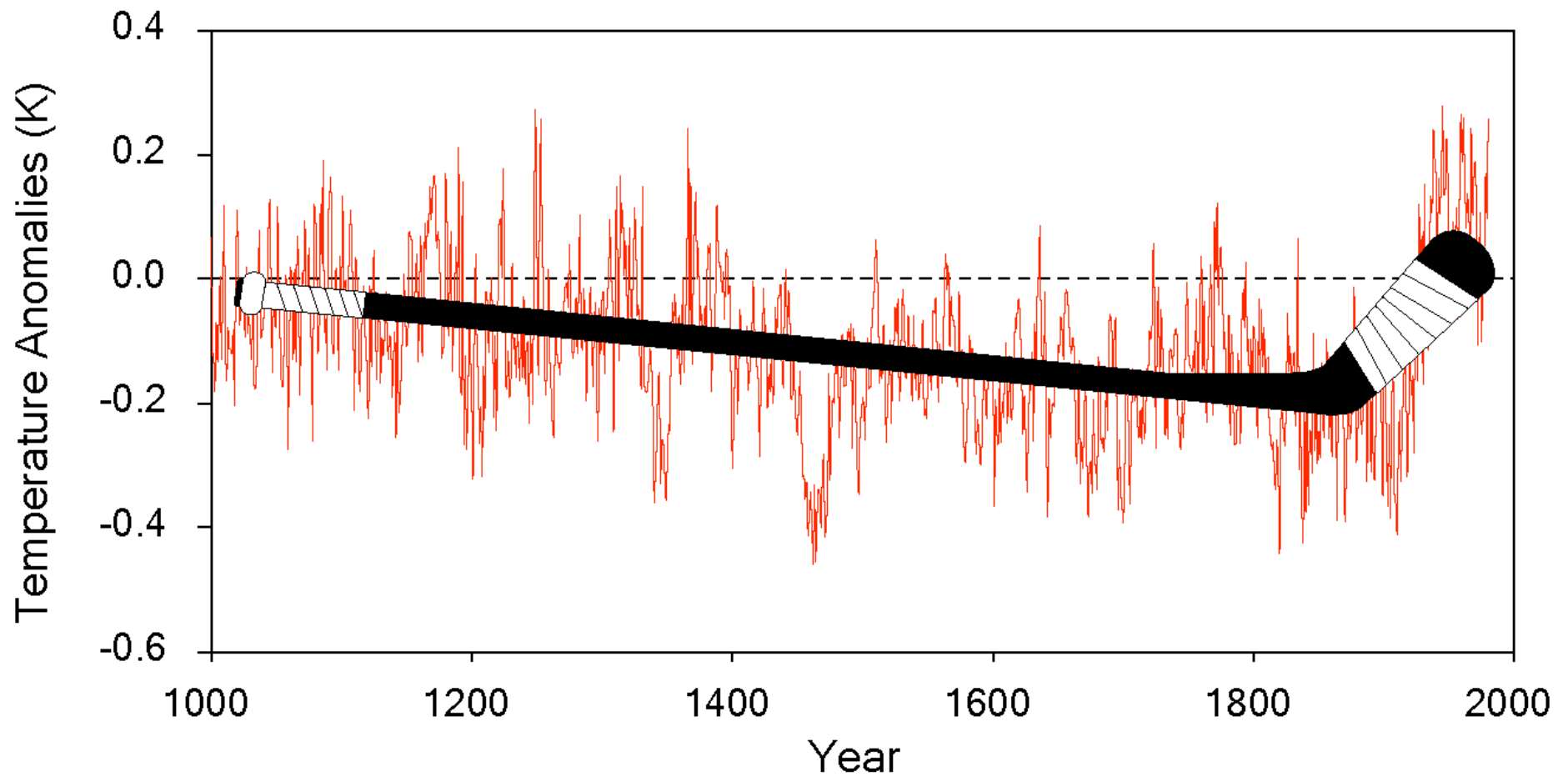
Lamont-Doherty Earth Observatory of Columbia University



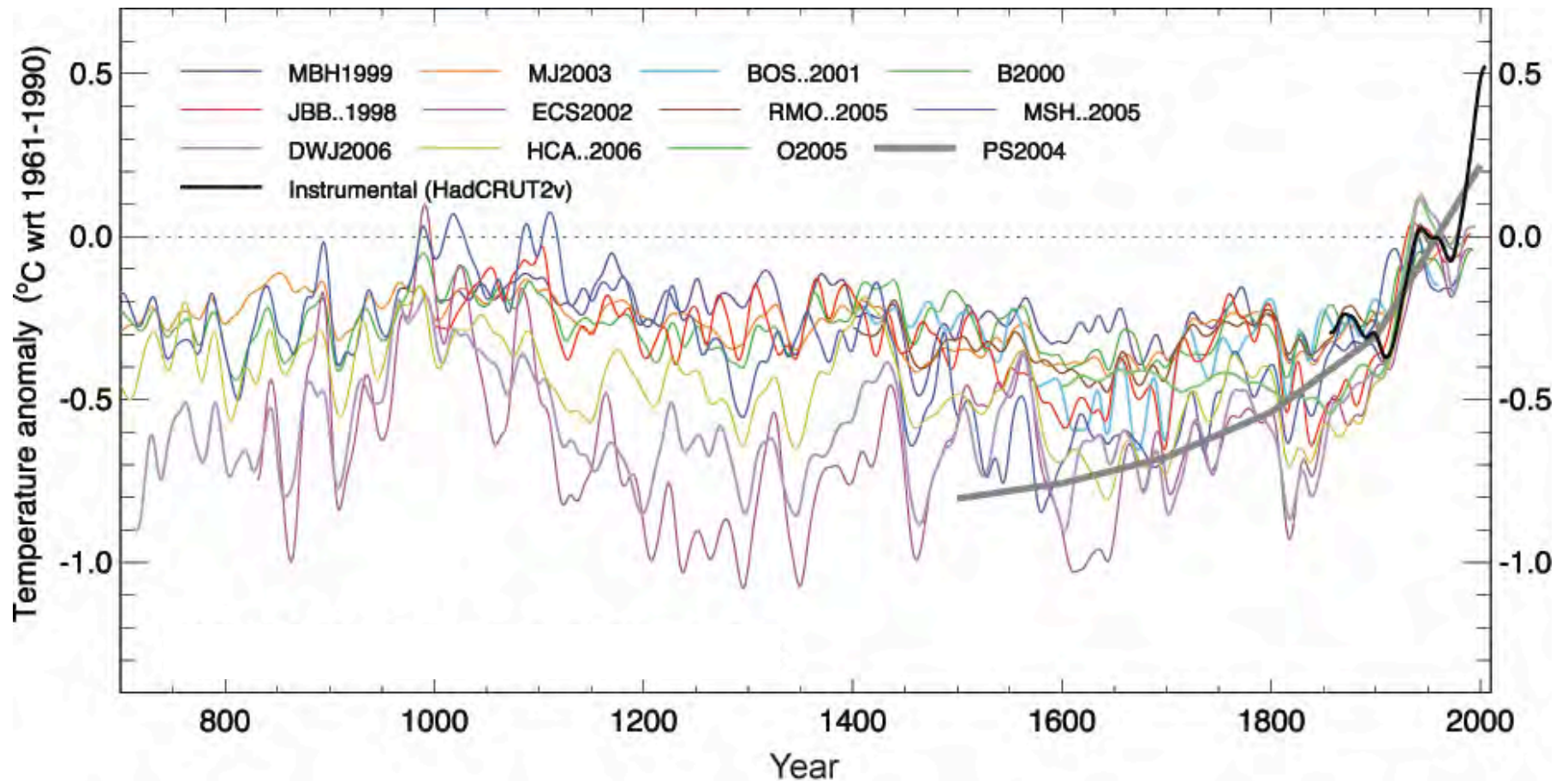
Talk Goals

- Provide a historical context to the more recent controversies surrounding the CRU emails.
- Explain some of the scientific issues behind the CRU email controversy
- Discuss some of the political developments that have arisen as a result of the controversy
- Have an open discussion about the controversy, the related science and the political implications

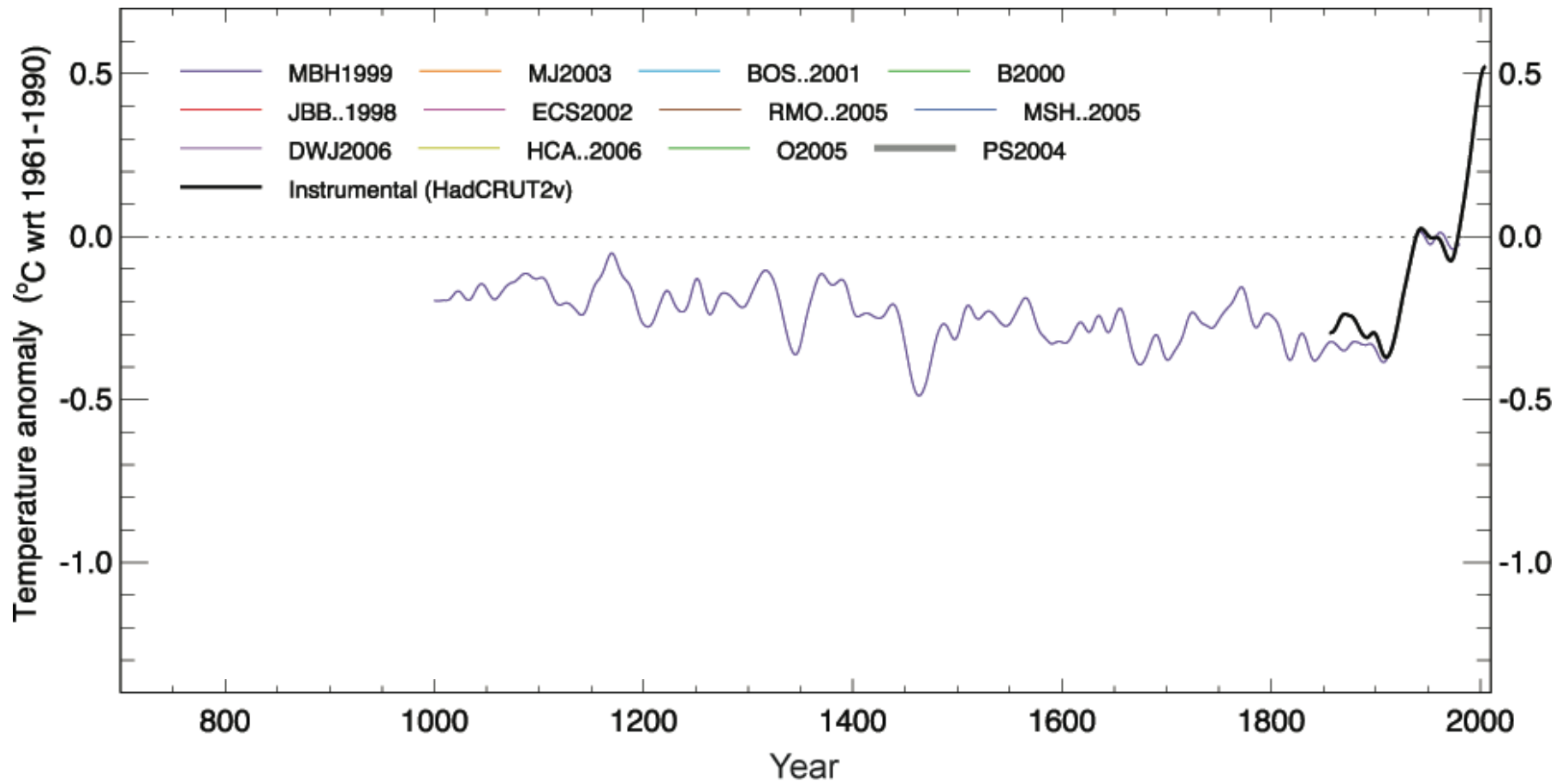
The Hockey Stick Controversy



Which One is the Hockey Stick?



Which One is the Hockey Stick?



Mann et al., *Nature*, 1998

articles

Global-scale temperature patterns and climate forcing over the past six centuries

Michael E. Mann*, Raymond S. Bradley* & Malcolm K. Hughes†

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Spatially resolved global reconstructions of annual surface temperature patterns over the past six centuries, based on the multivariate calibration of widely distributed high-resolution proxy climate indicators, show strong correlations of the reconstructions with time-series records representing changes in greenhouse gas concentrations, solar irradiance, and volcanic aerosols suggest that each of these factors has contributed to the warming of the past century, with greenhouse gases emerging as the dominant forcing during the past 50 years. Northern Hemisphere mean annual temperatures for three of the past eight years are warmer than any year since AD 1400.

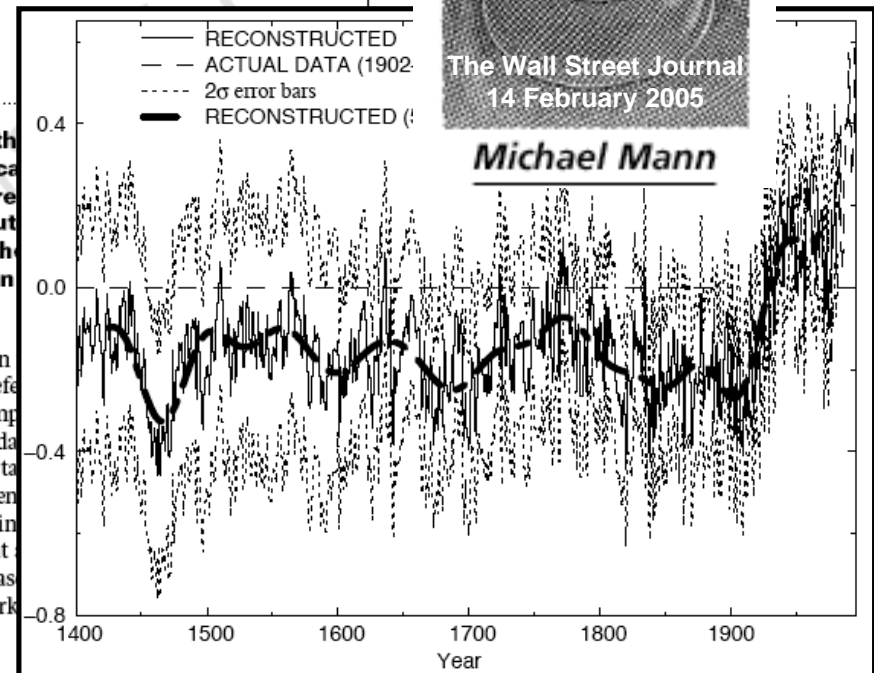
Knowing both the spatial and temporal patterns of climate change over the past several centuries remains a key to assessing a possible anthropogenic impact on post-industrial climate¹. In addition to the possibility of warming due to increased concentrations of greenhouse gases during the past century, there is evidence that both solar irradiance and explosive volcanism have played an important part in forcing climate variations over the past several centuries^{2,3}. The unforced 'natural variability' of the climate system may also be quite important on multidecadal and century timescales^{4,5}. If a faithful empirical description of climate variability

instrumental records have been available since the late 19th century, they lie relative to the 1902–80 reference period. The 5° × 5° grid (yielding 11 temperature and precipitation grid-point series data to that shown in Fig. 1b. Certain data sets have been smaller number of leading principal components depending on the spatial extent of representation ensures a realistic description in the multiproxy network

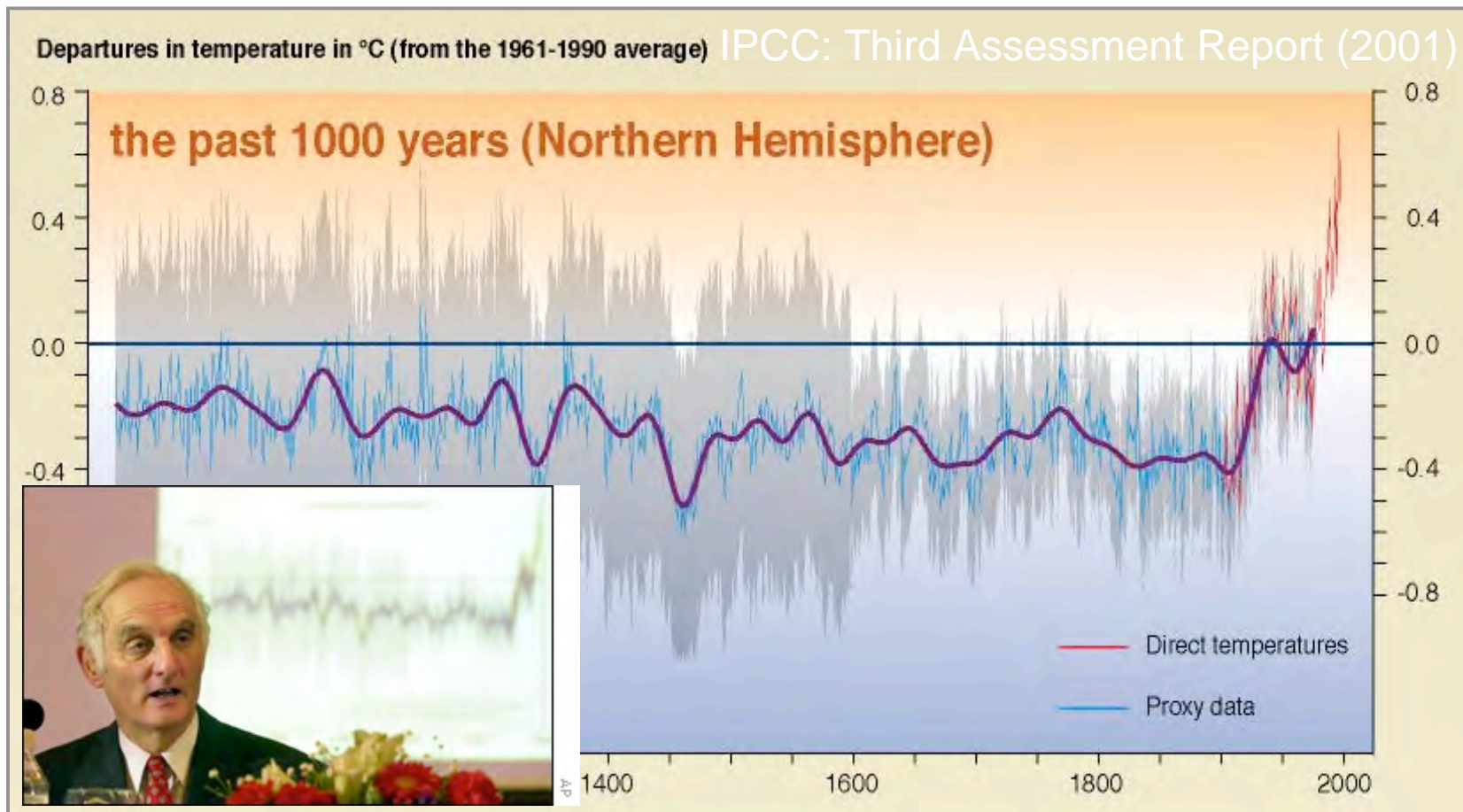


The Wall Street Journal
14 February 2005

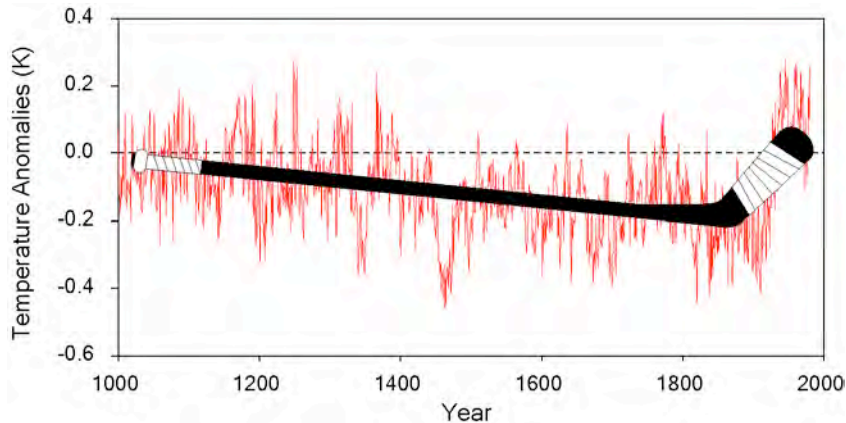
Michael Mann



The Hockey Stick was BIG News!



“The 1990s are likely the warmest decade, and 1998 the warmest year, in at least a millennium” - Mann et al., GRL, 1999



Interpretation of the scientific debate has taken on its own dimension in policy circles and in the media...

- **HS Protagonists:** Proof of anthropogenic global warming!!!
- **HS Antagonists:** The HS is wrong and therefore so is the whole ‘business of climate research.’

The HS became one of the central battlegrounds for *policy* debates about global warming, used by advocates as proof of the anthropogenic effect on climate or by ‘climate contrarians’ as proof of a lack of rigor in climate science.

Pollack et al. (1998) and Huang et al. (2000): Geothermal Reconstructions

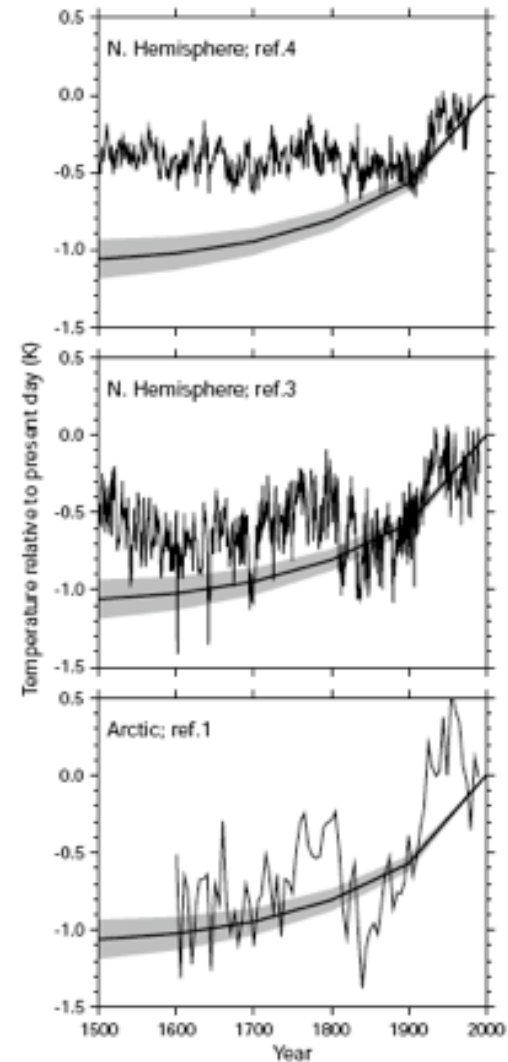
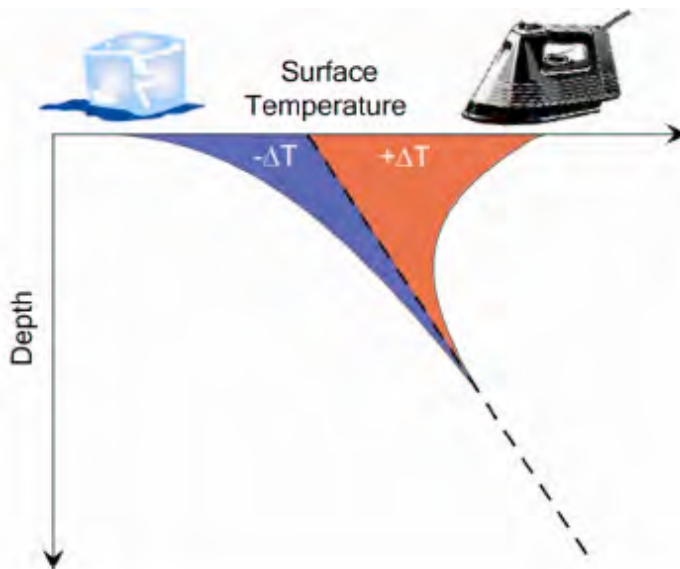
letters to nature

Temperature trends over the past five centuries reconstructed from borehole temperatures

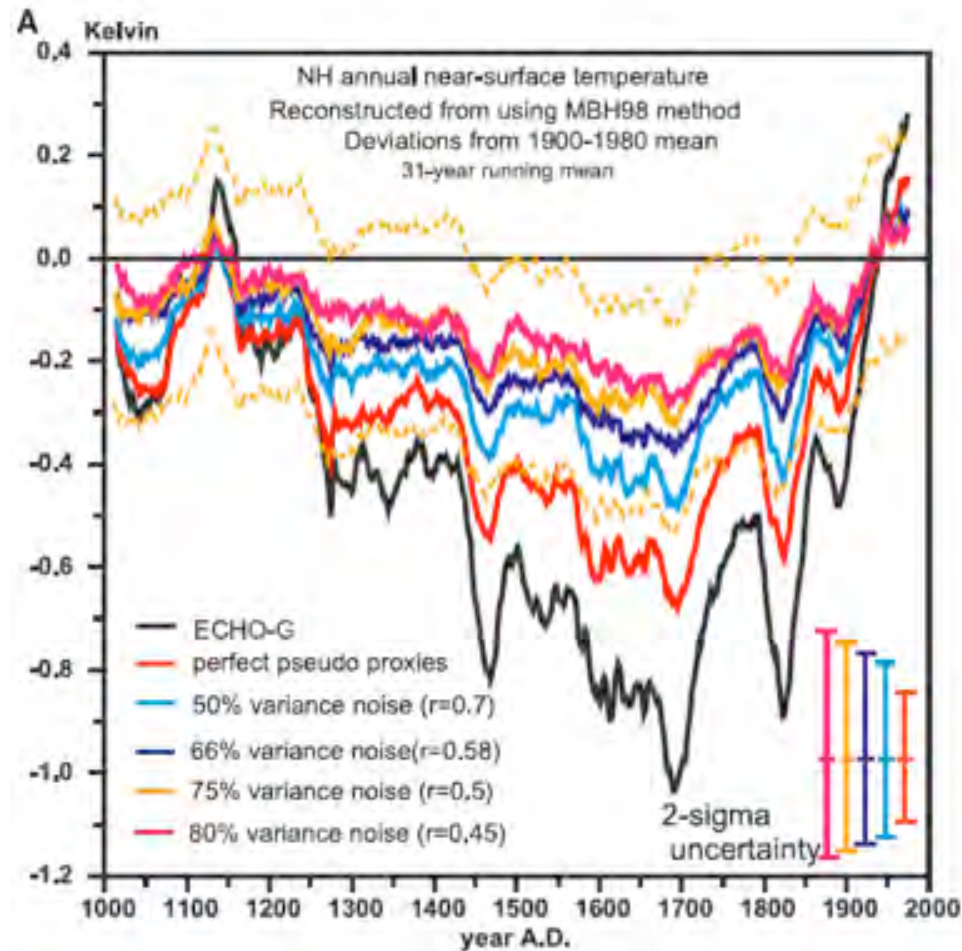
Shaopeng Huang*, Henry N. Pollack* & Po-Yu Shen†

* Department of Geological Sciences, The University of Michigan, Ann Arbor,
Michigan 48109-1063, USA

† Department of Earth Sciences, The University of Western Ontario, London,
Ontario, N6A 5B7, Canada

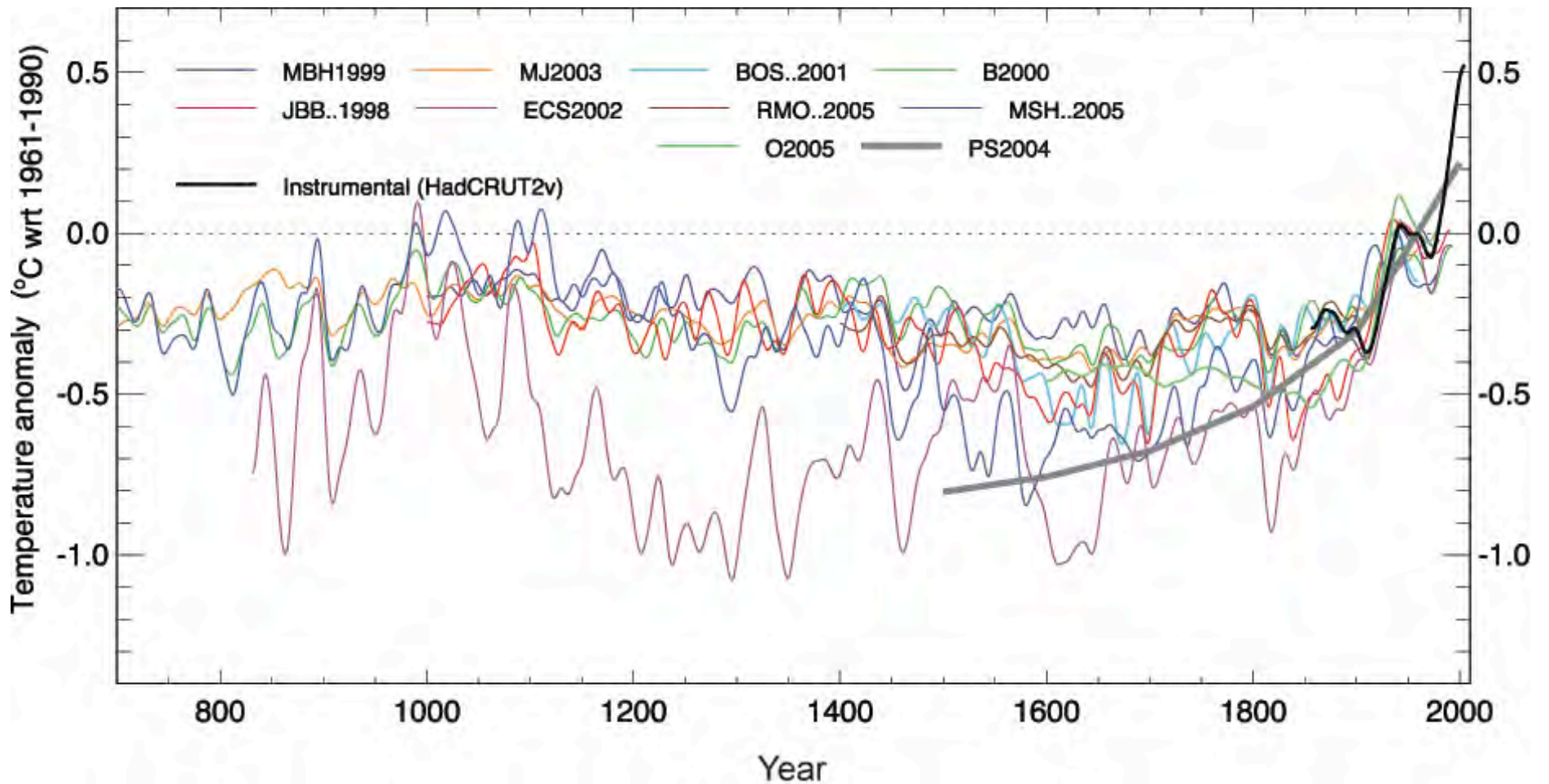


Testing the Hockey Stick Method



von Storch, H., E. Zorita, J. M. Jones, J. F. Gonzalez-Rouco, S. F. B. Tett, 2004: Reconstructing Past Climate from Noisy Data, *Science*, 312, 5773, 529.

State of the Debate in 2005



McIntyre & McKittrick, The Wall Street Journal and the Honorable Joe Barton of Texas...

- **12 February 2005:** Steve McIntyre (minerals exploration company) and Ross McKittrick (Econ Prof at U. Guelph) published a paper in *Geophysical Research Letters* outlining a statistical problem in a part of the HS method.
- **14 February 2005:** WSJ publishes the following article motivated by the M&M article (front page): *In Climate Debate, The 'Hockey Stick' Leads to a Face-Off*
- **23 June 2005:** Admittedly motivated by the WSJ article, Congressman Joe Barton (R-TX) and the House Committee on Energy and Commerce send 'exploratory' letters to the three HS authors that include requests for computer codes, data, descriptions of past funding agreements, and scientific rebuttals to the M&M paper.



Stephen McIntyre

The Wall Street Journal
14 February 2005

The Community Responds to the Barton Inquiry

European Geosciences Union - *“We do not consider personal inquisition of individual scientists as an appropriate way of probing the validity of the general scientific statements in the IPCC third assessment report...”*

<http://www.egu.eu/fileadmin/files/egustatement.pdf>

The Community Responds to the Barton Inquiry

Alan Leshner (American Association for

the Advancement of Science) - *“We very much appreciate the Committee’s interest in this important field. Your letters, however, in their request for highly detailed information regarding not only the scientists’ recent studies but also their life’s work, give the impression of a search for some basis on which to discredit these particular scientists and findings, rather than a search for understanding...”*

http://www.aaas.org/spp/cstc/docs/05-7-13_climatebarton.pdf

The Community Responds to the Barton Inquiry

A letter from 20 leading scientists in the field - “Requests to provide all working materials related to hundreds of publications stretching back decades can be seen as intimidation - intentional or not - and thereby risks compromising the independence of scientific opinion that is vital to the preeminence of American science as well as to the flow of objective advice to the government...”

<http://www.guardian.co.uk/environment/2005/aug/30/usnews.research>

The Community Responds to the Barton Inquiry

Sherwood Boehlert (The House Committee on Science) - *“I am writing to express my strenuous objections to what I see as the misguided and illegitimate investigation you have launched concerning Dr. Michael Mann, his co-authors and sponsors...”*

http://www.usatoday.com/tech/science/2005-07-17-boehlert-barton_x.htm

Committee on Energy and Commerce

*Subcommittee on Oversight and Investigations Surrounding
the 'Hockey Stick' Temperature Studies:
Implications for Climate Change Assessments*

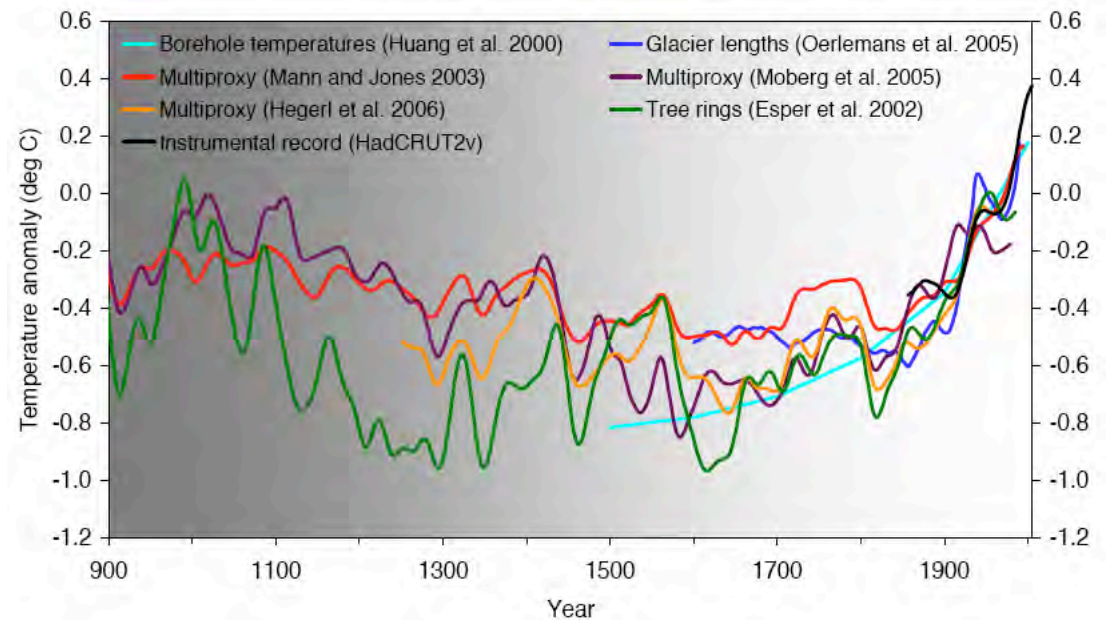
July 19th and 27th, 2006



The US National Academies of Science Weigh In...



June 22nd, 2006



The “Blog Effect”



Climate Audit

Started *9 November 2004* by Michael Mann and Gavin Schmidt.

First posts focused on the McIntyre and McKittrick arguments and a new paper that Mann and fellow coauthors claimed to refute the claims of McIntyre and McKittrick.

Started *31 January 2005* by Steven McIntyre.

First posts were also focused on Hockey-Stick issues as they related to the representation of McIntyre’s work. *A cause celebre for this community was data and code availability.*

Data Sharing and FOIA Requests

Central to many of the original criticisms of the principal scientists involved in the CRU email controversy was the issue of [data and code availability](#).

Although most of the data were publicly available (e.g. 95% of the station data for the CRU instrumental temperature record), some were not (for good and bad reasons).

Following the example of several prominent bloggers, FOIA requests were filed by many US and UK citizens and became a strategy for requesting information from several prominent scientists who had become known for being uncooperative.

Of [105 requests concerning](#) the Climatic Research Unit up to December 2009, the university refused 77, accepted six in part, had 11 outstanding, and had only 10 released in full. One was withdrawn.

The CRU Hack: What Happened?

160 MB of data were copied from a server of the Climatic Research Unit containing more than **1,000 emails** and 3,000 other documents. These files were collectively packaged in a compressed file named **FOIA.zip**.

On 17 November 2009 the RealClimate blog was hacked and a post revealing the stolen files was created. This effort was thwarted almost immediately when it was discovered.

The file was then posted to a **Russian** website and advertised through links at climate skeptics' blogs using web servers located in **Saudi Arabia** and **Turkey**.

And then:



http://en.wikipedia.org/wiki/The_Scream

Some General Allegations

“deliberate and systematic attempt to manipulate data”

“arbitrary adjustment and cherry picking of data to support their global warming claims”

“deleting data adverse to their theories”

“abused the process of peer review”

“did not comply with or subverted FOIA requests”

British House of Commons, Science and Technology Committee, ***The disclosure of climate data from the Climatic Research Unit at the University of East Anglia***, 24 March 2010.

Inquiries and Reports

Pennsylvania State University Inquiry

Commissioned by the PSU

Published: 3 February 2010

http://www.research.psu.edu/orp/Findings_Mann_Inquiry.pdf

The disclosure of climate data from the Climatic Research Unit at the University of East Anglia

British House of Commons, Science and Technology Committee

Published: 24 March 2010

<http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/387/38702.htm>

Scientific Appraisal Panel

Commissioned by the UEA

Published: 14 April 2010

<http://www.uea.ac.uk/mac/comm/media/press/CRUstatements/SAP>

Independent Climate Change Email Review

Commissioned by the UEA

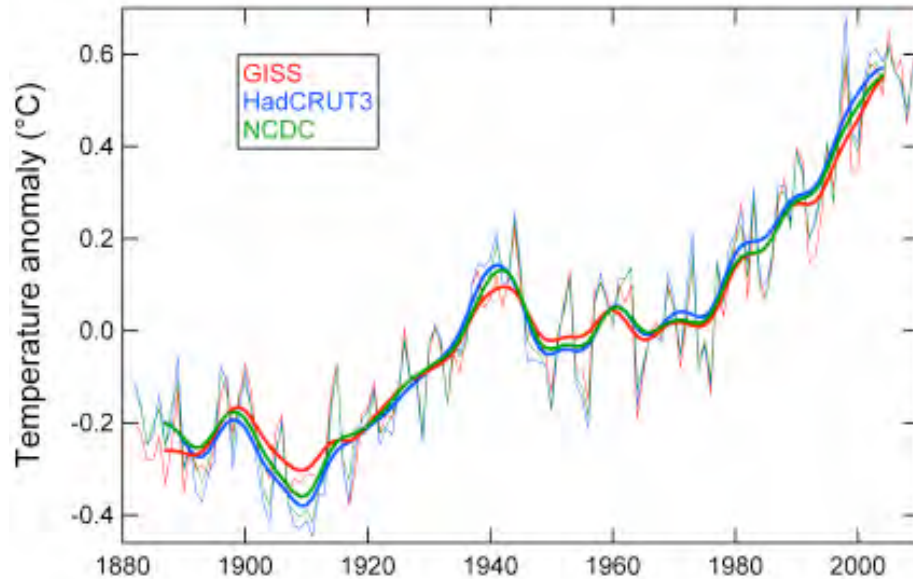
<http://www.cce-review.org/index.php>

Findings of the Inquiries

- *No* scientific result or conclusion was shown to be manufactured, manipulated or mistaken.
- It was acknowledged that some statistical methods were naïve and not fully up to the task of the problems to which they were applied.
- Multiple reports criticized the data and code sharing practices of the scientists involved.
- UK Information Commissioner Office stated that emails leaked or stolen from CRU reveal that Freedom of Information requests “were not dealt with as they should have been under the legislation.”

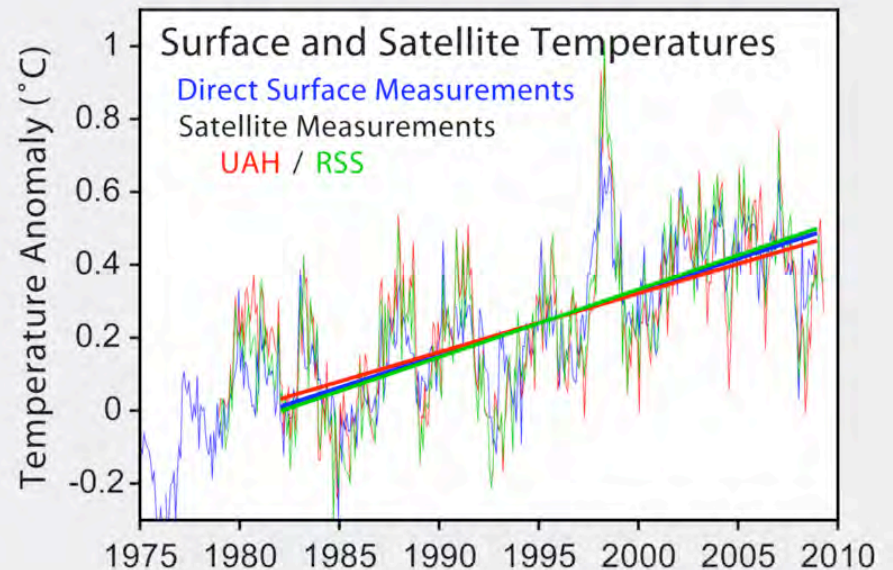
The Surface Temperature Record

Multi-Analysis Surface Temperature Record Comparison



<http://ourchangingclimate.wordpress.com/2010/03/01/global-average-temperature-increase-giss-hadcru-and-ncdc-compared/>

HadCRU Comparison to Satellite Measurements



http://en.wikipedia.org/wiki/Satellite_temperature_measurements

“Hide the Decline” and “The Trick”



Trees tell of past climates: but are they speaking less clearly today?

K. R. Briffa¹, F. H. Schweingruber², P. D. Jones¹, T. J. Osborn¹, I. C. Harris¹,
S. G. Shiyatov³, E. A. Vaganov⁴ and H. Grudd⁵

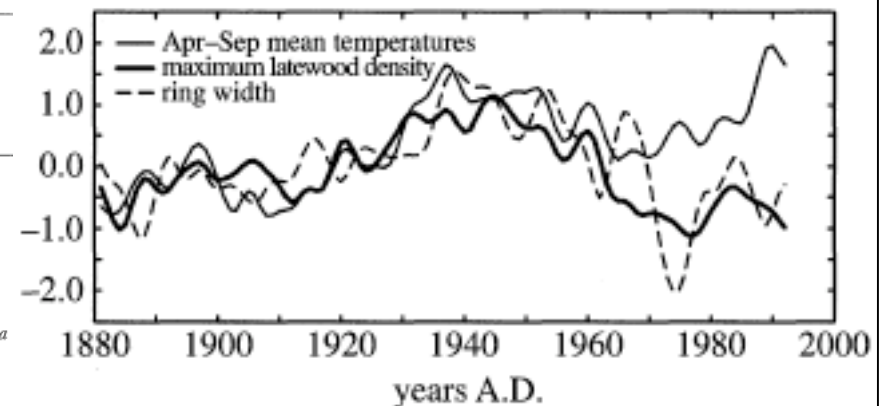
¹Climatic Research Unit, University of East Anglia, Norwich NR4 7TJ, UK

²Swiss Federal Institute for Forest, Snow and Landscape Research, Zürcherstrasse 111, CH-8903, Birmensdorf, Switzerland

³Institute of Plant and Animal Ecology, Ural Branch of the Russian Academy of Sciences, 8 Marta Street, Ekaterinburg 620219, Russia

⁴Institute of Forest, Siberian Branch of the Russian Academy of Sciences, Krasnoyarsk 660036, Russia

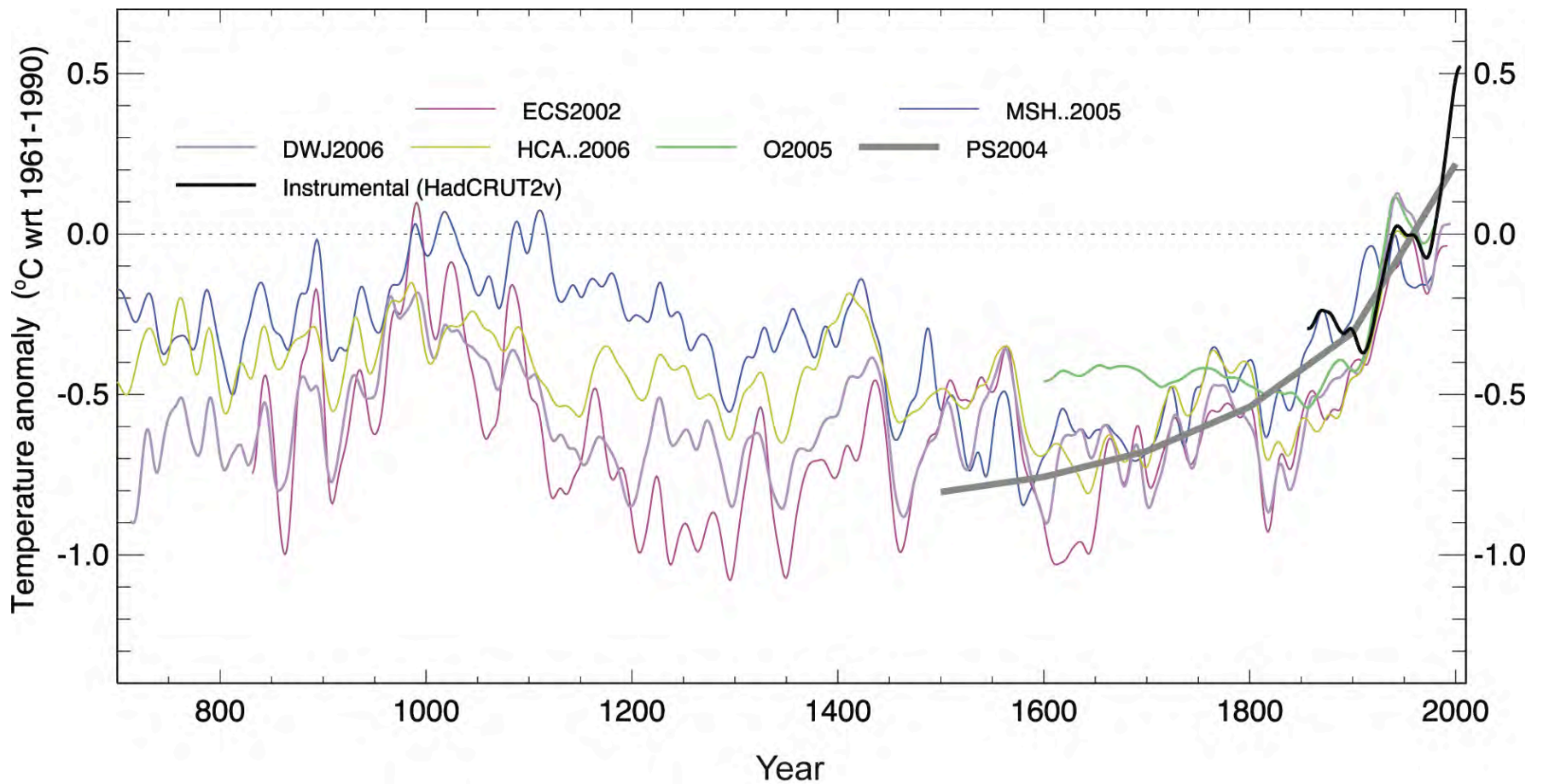
⁵Naturgeografiska Inst., Stockholms Universitet, 106 91 Stockholm, Sweden



Briffa et al., **1998**: *Philosophical Transactions of the Royal Society of London Series B - Biological Sciences*, 353, 1365, 65-73.

The **divergence problem** is an important and poorly understood phenomenon exhibited by some trees in high northern latitudes. It has been discussed and researched for more than a decade.

What if only reconstructions independent of the scientists involved in the CRU Emails existed?



What does real scientific fraud look like?

Hwang Woo-Suk



<http://news.bbc.co.uk/2/hi/asia-pacific/4554704.stm>

On May 12, 2006, Hwang was indicted on charges of fraud, embezzlement and breach of South Korea's bioethics law.

An internal panel was set up in Seoul National University to investigate the allegation on December 17, 2005. On December 23, 2005 the panel announced its initial finding that Hwang had intentionally fabricated stem cell research results creating nine fake cell lines out of eleven, and added that the validity of two remaining cell lines is yet to be confirmed.

Hwang embezzled 2.8 billion won (\$3 million) out of some 40 billion won in research funds for personal purposes and the illegal purchase of ova used in his experiments.

http://en.wikipedia.org/wiki/Hwang_Woo-Suk#The_indictment_of_Hwang_and_five_of_his_collaborators

Data and Code Sharing

- Researchers who invest a lot of time and effort into collecting data should be allowed the first chance to analyze their data. How long should that take?
- What are the appropriate data file and code formats for archiving (open source vs. proprietary)?
- Who pays for the infrastructure necessary to serve and maintain code and data archives?
- What is a scientist's responsibility for providing "customer assistance" for the software they generate?
- How user friendly should code written for research purposes be?

State attorney general demands ex-professor's files from University of Virginia (Washington Post, 4 May 2010)



Ken Cuccinelli II

*“The civil investigative demand asks for **all data and materials** presented by former professor Michael Mann when he applied for five research grants from the university. It also gives the school until May 27 to produce **all correspondence or e-mails** between Mann and 39 other scientists since 1999.”*

Climate Change and the Integrity of Science (*Science*, 7 May 2010)

255 US National Academy Members, Including 11 Nobel Laureates

“We are deeply disturbed by the **recent escalation of political assaults** on scientists in general and on climate scientists in particular.”

“There is always some uncertainty associated with scientific conclusions; **science never absolutely proves anything**. When someone says that society should wait until scientists are absolutely certain before taking any action, **it is the same as saying society should never take action**.”

“Scientific conclusions derive from an understanding of basic laws supported by laboratory experiments, observations of nature, and mathematical and computer modeling. Like all human beings, scientists make mistakes, but the **scientific process is designed to find and correct them**. This process is inherently adversarial - scientists build reputations and gain recognition not only for supporting conventional wisdom, **but even more so for demonstrating that the scientific consensus is wrong and that there is a better explanation**.”

Climate Change and the Integrity of Science (*Science*, 7 May 2010)

“We also call for an end to **McCarthy-like threats** of criminal prosecution against our colleagues based on innuendo and guilt by association, the harassment of scientists by politicians seeking distractions to avoid taking action, and the outright lies being spread about them.”

“Many recent assaults on climate science and, more disturbingly, on climate scientists by climate change deniers are typically driven by special interests or dogma, **not by an honest effort to provide an alternative theory that credibly satisfies the evidence.**”

What is the cost?

“We also call for an end to McCarthy-like threats of criminal prosecution against our colleagues based on innuendo and guilt by association, the harassment of scientists by politicians seeking distractions to avoid taking action, and the outright lies being spread about them.”

Before



After



“The leak was bad. Then came the death threats.”

The Sunday Times, 7 Feb. 2010

<http://www.timesonline.co.uk/tol/news/environment/article7017905.ece>

Discussion Points

- What are the implications of the identity of the person or organization who illegally accessed the CRU data (hacker or whistleblower)?
- Why did the CRU email controversy attain such prominence?
- What is peer review and how should it function?
- What is the difference between science communication and advocacy of scientifically informed policy? What should we expect from scientists who engage in one or the other?
- What are the costs of ideologically driven objections to scientific conclusions?