Spin can't hide the facts concerning the hockey stick

Stephen McIntyre and Ross McKitrick

June 26, 2006

Earlier this year, the US Congress asked the National Academy of Sciences (NAS) to investigate the "hockey stick" graph used by the Intergovernmental Panel on Climate Change (IPCC) to promote the idea that humans are causing rapid and unprecedented global warming. The idea for an NAS panel arose when the House Energy and Commerce Committee learned about our work and began investigating media reports that Michael Mann, the IPCC lead author and also author of the federally-funded research promoted by the IPCC, was refusing to disclose all his data and methods. The Energy Committee was interested in non-disclosure and possible misrepresentation of findings. The House Science Committee got involved and asked the NAS to look at it, posing three softball questions about the "current scientific consensus" and the criticisms of the hockey stick. The NAS itself further watered down the Science Committee questions into a general survey of methodological issues in paleoclimatology.

The final report of the NAS panel was released on Thursday June 22. Despite their diluted mandate, they discussed the Mann hockey stick in some detail. Their most important findings are buried in the technical chapters and, despite our efforts to explain them to reporters that day, were not reflected in subsequent media coverage. There is no question that we lost the 'spin war.' Simplistic headlines proclaimed "Earth has a fever", or "Panel finds support for hockey stick," etc. Reporters said the NAS had concluded that Mann's results are "likely correct" and they placed a high level of confidence in the finding that the world is warmer than it's been in 400 years.

But behind the spin, the report itself accepts and articulates all the criticisms we leveled at the hockey stick and related paleoclimate papers. How one set of findings could be spun into the opposite conclusion is a good illustration of media bias, and of the inherent inability of expert committees to grapple with controversial issues.

One of the big selling features of the hockey stick was its apparent ability to extract a subtle "climate signal" from noisy tree ring data, thereby reducing statistical uncertainty and increasing the robustness of the conclusions. We explained to the NAS that the hockey stick method systematically underestimated the uncertainties in the data, a point they accepted (p. 107). We said the hockey stick had no statistical significance, and was no more informative about the distant past than a table of random numbers. In very subtle wording they agree (p. 91): Mann's data set does not have enough information to verify its 'skill' at resolving the past, and has such wide uncertainty bounds as to be no better than the simple mean of the data (p. 91). We said that the appearance of significance was created by ignoring all but one type of test score, thereby failing to quantify all the relevant uncertainties. The NAS agreed (p. 110), but, again, did so in subtle wording.

We also argued that the hockey stick relied for its shape on the inclusion of a small set of invalid proxy data (called bristlecone, or "strip-bark" records). If they are removed, the conclusion that the 20th century is unusually warm compared to the pre-1450 interval is reversed. Hence the conclusion of unique late 20th century warmth is not robust—in other word it does not hold up under minor variations in data or methods. The NAS panel agreed, saying Mann's results are "strongly dependent" on the strip-bark data (pp. 106-107), and they went further, warning that strip-bark data should not be used in this type of research (p. 50).

We criticized pervasive secrecy regarding data and methods among paleoclimate scientists, citing many problems not only in obtaining access to data, but in extreme cases even getting a listing of the data used. Our experiences with Mann go back a long way but almost all the major new studies over the past few years by other high profile authors use unpublished data and, in some cases, unexplained statistical methods. Some authors have refused to disclose their data and clarify their methods even after publication, despite requests from major journals like *Science*. The NAS panel addressed this, saying "a clear explanation of analytical methods is mandatory" and "Peers should have access to the information needed to reproduce published results, so that increased confidence in the outcome of the study can be generated inside and outside the scientific community." (p. 112)

So, put all these findings together and the obvious conclusion is… that the hockey stick is "likely correct"? That the NAS has given Mann, in the words of one Internet commentator, a "near-complete vindication"?

Only in the weird world of climate science and global warming reporting, could such a report lead to this spin. It took a lot of hard work to crack open the research behind the hockey stick, get critical papers into print and, in the end, get a hearing with the NAS. It was always too much to hope that we would win over the mainstream media or the pro-IPCC blogosphere. We went into the NAS process confident that at the end of the day we would win the substantive scientific arguments, and, at the risk of sounding smug, we are satisfied that we did so.

But we did not expect the NAS to be so afraid of controversy that they would blur their own conclusions in a wash of contradictory caveats. For example, citing our research, they concluded that "Mann et al. used a type of principal component analysis that tends to bias the shape of the reconstructions." (p. 106) and their method is "not recommended." But then they cite five other studies that reached "qualitatively similar" results to Mann's, so (they opine) maybe his method wasn't so bad. But surely they know that the other studies all rely on strip-bark data, and two of them use the identical data set as Mann, which the NAS elsewhere says has too little information to provide verifiable conclusions about the past. The other three are either known to be sensitive to minor variations in methods and data, or the authors have simply refused to disclose their data, preventing their "peers" from having confidence in their results.

Elsewhere the NAS offers the hockey stick a figleaf of respectability by citing in its support another of Mann's papers, and a recent one by two British authors, both of which use the biased principle component method and the invalid strip bark data.

And even as they try to claim some remaining confidence in Mann's conclusions, they also cite a recent German study which took Mann's data and analysed it using 64 minor variations on his method, yielding a bewildering variety of contradictory climate histories for the Earth, with no way to conclude which one, if any, is correct.

The bottom line is, current data and methods do not tell us if the present climate is unusually warm compared to the past one or two thousand years, and the NAS panel said so, for those with ears to hear. But in the politicized world of global warming research, few have the nerve to say so plainly, even an expert panel of the NAS. The IPCC hockey stick proved to be too useful to too many powerful people (not least, lately, Al Gore). As soon as the NAS report was out, an accomplished climate scientist wrote to us that the NAS report was as critical of the hockey stick as is "nowadays possible." What a sad commentary on his field.

But the spin can't hide the facts forever. The Earth's climate refuses to be fit into a simplistic model. Even if hotshot researchers and grandstanding expert panels can find clever ways to force their data into

linear boxes, nature is not obliged to crawl in with them. Deep in the details of their latest report, the National Academy has opened the door to a renewal of scientific rigour and objectivity in climate research. We would have liked it if the press and the blogosphere could celebrate that, but at least the process has started.