

Comments on Independent Climate Change Review

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My name is Professor Simon Tett. Since summer 2007 I've worked at the University of Edinburgh. From 1991 to 2007 I worked for the Met Offices' Hadley Centre first as a research scientist then as a team leader. As a team leader I lead a group of about 8 scientists who worked in the general area of observed climate change. Following long-standing Met Office strategy we collaborated closely with the Climatic Research Unit, University of East Anglia.

My personal areas of research were Detection and Attribution of Climate Change and understanding uncertainties in observations. I have also worked with Phil Jones, Keith Briffa and Tim Osborn, all from CRU, on various occasions throughout my career.

I'm choosing to comment on several of the issues raised in the review.

1) *"... ignoring potential problems in deducing paleotemperatures..."*

To me Keith Briffa and Tim Osborn have always been open about the issues with paleo-climate reconstructions. So we discussed the "divergence" issue on several occasions. Prof. Briffa also impressed on me the key issue is that reconstructions from tree-rings and tree-ring densities are also likely to lose variance on low frequencies (centuries) due to the corrections needed for tree growth. I also worked with Keith Briffa on the SOAP proposal/project, a NERC directed bid that eventually became part of RAPID and a failed EU proposal. At all times I was impressed by his conscientiousness and willingness to deal with issues.

2) *"... alleged that proxy temperature deductions and instrumental temperatures have been improperly combined..."*

My take on this is that the CRU team were trying to show, at the time, the best estimate of climate change over a long period. At the time when the WMO report was being published the team had published a paper in Nature the previous year (Briffa et al, 1998) showing a divergence between tree-ring density and temperature measurements.

3) *"... improper bias in selecting and adjusting data so as to favour" & "... important data available..."*

I was part of the team that worked on the HadCRUT3 paper (Brohan et al, 2006) – the latest version of the combined land surface/sea surface temperature record.

My team also had the responsibility for producing regular updates to various climate records. For the land surface temperature record the Hadley Centre would decode, then quality control incoming CLIMAT messages. Data from these messages included, amongst other variables, average temperatures for the month from 1000-2000 stations across the world. This decoded and quality controlled temperature data would be passed to CRU for them to update their gridded land surface record. This

would then be passed back to the Hadley Centre for merging with the Sea Surface Temperature record. This process could be slow and required Phil Jones to take the data, run it through his gridding algorithm and pass it back to the Met Office. When we were thinking about the work for a new land surface record we discussed with Phil Jones the possibility that the entire process could run at the Met Office *but* with him still owning the land surface record. We verbally agreed that the raw dataset used by us for the gridding would still be owned by Phil Jones. One issue was the data disclosure agreements that UEA scientists had signed with some Met Organisations. So as part of the work on the HadCRUT3 record (published eventually as Brohan et al, 2006) we modified the process so that the data processing was all done at the Hadley Centre. We also agreed that every so often Prof. Jones would provide for gridding a new version of his station database with what ever updates and changes he had made to the data set. The Met Office would carry out interim updates using the near-realtime data that it Quality Controlled. However, the station database was “owned” by Prof. Jones and not by the Met Office.

Phil Jones updates his records as he finds out about changes. For example I recall him telling me that Australia had changed the way in which they calculated average temperature. They had used to compute average temperature from the average of the daily minimum and maximum temperatures but then had changed to be the average of all the hourly readings. This change had introduced a bias which Prof. Jones had found and corrected. He also reported the issue back to the Australians.

Considerable effort is required to update the data base – something that Prof. Jones does, as far as I can tell, without significant grant funding from NERC.

The issue of data openness and data curatorship has been raised by many commentators. I think it would be very hard for CRU to do what is being asked of them. They have little resources to provide long term data curatorship and serve that data to the research community let along a wider community of people interested in the data. What is really required is a change of view amongst national met services including the Met Office on the provision of raw data for subsequent analysis. In particular that it should be freely available for *bona fide* research (which would not necessarily mean available to **everyone**). Then CRU (and other researchers) could use this data as they see fit. One could also require CRU (and others) to make their compiled instrumental data bases available through BADC and other data centres on the assumption they were funded through NERC for this work. Though given the frequent updates to instrumental databases this might require considerable resources at the data centre to support. Another issue that needs attention is the communication of the bias adjustments back to the National Met Services – so that they can be archived and curated there.

4) “*The scrutiny and reanalysis of data by other scientists...*”

I think this claim comes about through a misunderstanding. The primary data used by CRU is available from the National Met Services and some of it was made available to CRU under various restrictions; in particular that the data could only be used for the original purpose requested and by *bone fide* researchers. The Met Office still provides data with this restriction today. This is a consequence of the need for National Met Services to raise more revenue through selling data to users. This is

particularly the case for Europe and some developing world countries. This is far from ideal but CRU (and others) needed to make progress so did what they could.

The US has assembled a dataset of station level records which are available to anyone (US government policy on data access is very different from European governments views). This Global Historical Climate Network (GHCN) database could have been used to replicate the CRU approach and if significant differences were found then I'm fairly sure a paper would have been written and published. The Goddard Institute of Space Science (GISS) and National Oceanographic and Atmospheric Administration (NOAA) analysis use these records and do not have substantial disagreements with the CRU analysis. Further analysis of sea surface temperature and night marine air temperatures carried out at the Met Office's Hadley centre also point to a warming world.

In my view the "hypothesis" that the world was warming has been tested very strongly with a series of independent analysis.

If others wanted to verify CRU's land surface temperature analysis they could have taken the GHCN and processed it. If they wanted to verify the marine analysis they could have taken the ICOADS database and processed that. I think a competent team could have done a basic analysis with a few person-months of effort. Though they would have found detailed differences the overall picture would be, I'm almost certain, very similar.

5) Final remarks

I'd like to finish by saying that I've worked with the CRU team for many years. Throughout that period they've never been anything but helpful and open with me. I continue to have great respect for their science and their integrity.