

## THE FRAUD ALLEGATION AGAINST SOME CLIMATIC RESEARCH OF WEI-CHYUNG WANG

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### ABSTRACT

Wei-Chyung Wang has been a respected researcher in global warming studies for decades. I have formally alleged that he committed fraud in some of his research, including research cited by the Fourth Assessment Report of the IPCC (2007) on “urban heat islands” (a critical issue). Herein, the allegation is reviewed, and some of its implications are explicated.

### 1. INTRODUCTION

The work of Jones et al. (1990) is a significant paper in global warming studies (see below for details). In February 2007, Stephen McIntyre blogged about evidence he had found showing that it was “impossible” for Jones et al. to have carried out their work as they had claimed.<sup>1</sup> An anonymous comment on the blog then indicated potential issues with the closely-related work of Wang et al. (1990).<sup>2</sup> Further study by myself found additional evidence of problems. The evidence particularly implicates Wei-Chyung Wang—the lead author of Wang et al. and a co-author of Jones et al.

Wang is a professor at the University at Albany, State University of New York. He has been doing research on climate for over 30 years, and he has authored or co-authored more than 100 peer-reviewed scientific papers. He has also received an Appreciation Plaque from the Office of Science in the U.S.A., commending him, “For your insightful counsel and excellent science. ...”. The plaque resulted in particular from his research on global warming.

I have written a Report that details evidence that Wang committed scientific fraud.<sup>3</sup> The Report was submitted to the University at Albany in August 2007, and a formal inquiry into research misconduct is now underway. A copy of the Report is in the Appendix. Following are explicating notes (which might be better read after the Appendix).

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<sup>1</sup>See <http://www.climateaudit.org/?p=1193>. McIntyre is an independent researcher.

<sup>2</sup>See <http://www.climateaudit.org/?p=1193#comment-88942>

<sup>3</sup>Briefly, the main evidence is as follows. The two papers relied on data from 84 weather stations in China that were required to have very few significant moves. Of the stations, 42 were classified as *rural* and 42 as *urban*. For 40 of the rural stations, no histories exist (hence moves cannot be determined); the other 2 stations had substantial moves. For 9 of the urban stations, no histories exist; most of the other 33 had substantial moves.

## 2. EXPLICATIONS

1. The term “fabrication” is formally defined by the U.S. government to mean *making up data or results and recording or reporting them*. Fabrication is one of the three officially-defined types of scientific misconduct (the other two being plagiarism and falsification).

2. The cited publications of Wang concern an issue with measurements of global temperature. As a simple example of the issue, consider a thermometer in the middle of a large grassy field. Suppose that there was a city nearby, and over time, the city expanded to replace the field with asphalt and buildings. Then the temperatures recorded by the thermometer would be higher, because asphalt, buildings, cars, etc. give off extra heat (constituting what is usually called an “urban heat island”).

This issue has been a concern in global warming studies, because many thermometers used by weather stations are in areas that have undergone increased urbanization. Such thermometers might show that temperatures were going up, even if the global climate was unchanging. It is widely accepted that some of the increase in measured temperatures during the past century is due to many weather stations being located in areas where urbanization has increased. A critical question is this: how much of perceived global warming is due to such urbanization effects?

3. The latest (2007) assessment report by the IPCC [Intergovernmental Panel on Climate Change] concludes that such urbanization effects are insignificant overall. One of the main studies cited by the report to justify that conclusion substantially relies on the claims that Wang fabricated—indeed, Wang is a co-author of the study.

The study is authored by Jones et al. (1990). It treats not only China (where Wang was responsible for supplying the data), but also Russia and Australia (where Wang had no responsibility). The regions of Russia and Australia are not considered here, but there is some evidence that they too are problematic.<sup>4</sup>

The study of Jones et al. is not the sole study relied upon by the IPCC report for its conclusion about the insignificance of the urbanization effects. Hence even if the study were wholly invalidated, this would not imply that the conclusion was unsupported. On the other hand, assumptions made in one of the other main studies, by Parker (2006), have since been strongly criticized, both in the peer-reviewed literature and on scholarly blogs.<sup>5</sup>

None of this means that the conclusion of the IPCC is incorrect. It does suggest, though, that a re-evaluation of the evidence would be appropriate.

4. The lead author of Jones et al. is Phil D. Jones. Jones is one of the world’s foremost global warming researchers; he is also one of the two Coordinating Lead Authors of the chapter in the IPCC report subtitled “surface and atmospheric climate change” (here “surface” refers to the surface of the Earth, i.e. where people live). This might be considered the most important chapter of the IPCC report. It is also the chapter that cites the study of Jones et al.

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<sup>4</sup>See, for example, the blog discussions at <http://www.climateaudit.org/?cat=52>.

<sup>5</sup>The only response from Parker of which I am aware is blogged at <http://www.climateaudit.org/?p=1813> (dated July 2007). That also references the main criticisms; see especially the comment by Roger A. Pielke, Sr.

How much did Jones know about Wang's fabrications? As discussed in my Report on Wang's claims, it appears very likely that Jones knew nothing at the time (1990). In 2001, however, Jones co-authored a study, by Yan et al., which considered two meteorological stations in China (at Beijing and at Shanghai). This study correctly describes how the stations had undergone relocations, and it concludes that those relocations substantially affected the measured temperatures—in direct contradiction to the claims of Wang. Thus, by 2001, Jones must have known that the claims of Wang were not wholly true.

On 19 June 2007, I e-mailed Jones about this, saying “this proves that you knew there were serious problems with Wang's claims back in 2001; yet some of your work since then has continued to rely on those claims, most notably in the latest report from the IPCC”. I politely requested an explanation. I have not received a reply.

**5.** The fabrications of Wang were confirmed (thus allowing the formal allegation) only when the data for Jones et al. was made available, in April 2007. For years previously, several people, most prominently Warwick Hughes<sup>6</sup> and Stephen McIntyre, had attempted to obtain this, and other, data from Jones. Jones had refused almost every request. Indeed, in response to requests from Hughes for data about his work on global temperatures, Jones replied, “Why should I make the data available to you, when your aim is to try and find something wrong with it?”<sup>7</sup>

Jones is a professor at a public university in the U.K. (the University of East Anglia). In early 2007, McIntyre and I separately filed formal requests for the data under the U.K. Freedom of Information Act. The university initially refused to release the data. I then drafted a letter to the U.K. Information Commissioner's Office, alleging that the university was in violation of statute, and sent the draft to the university, asking them to let me know if they believed the letter to be inaccurate. The data was then released.<sup>8</sup>

It is worth noting that obtaining the data was only possible because Jones is in the U.K. In the U.S.A., data for publicly-funded research does not have to be disclosed. Indeed, Wang had not responded to a request for data from Hughes, and was within U.S. law in doing so. (In 1998, Congress passed Public Law 105-277, which states that the OMB [Office of Management and Budget] should “... require Federal awarding agencies to ensure that all data produced under an award will be made available to the public through the procedures established under the Freedom of Information Act ...”. The OMB, however, refused.<sup>9</sup>)

**6.** Although the claims of Wang were fabricated, this does not necessarily mean that the conclusion reached by Jones et al. for China is incorrect. It might be that the conclusion is correct, and there is other, valid, evidence to support that.

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<sup>6</sup>An independent researcher; see <http://www.warwickhughes.com>.

<sup>7</sup>See for example <http://www.climateaudit.org/?p=403>. (Note too that Jones read the present work prior to publication—see Acknowledgments.)

<sup>8</sup>It was made available at <http://www.cru.uea.ac.uk/cru/data/jonesetal1990/>.

<sup>9</sup>The OMB instead implemented *Circular A-110*, which is greatly weaker. The reason given for doing this was that scientists did not want the requirement in Public Law 105-277.

Since the publication of Jones et al. (1990), there have been several studies on the effects of urbanization on temperature measurements in China. The most recent study, in 2007, is by GuoYu Ren and colleagues at the Laboratory for Climate Studies, China Meteorological Administration. This study concludes that a large part of the warming that has been measured in China is due to the effects of urbanization on measurement. (The study is also supported by the analysis of He et al. (2007) for the years 1991–2000.)<sup>10</sup>

Hence the conclusion of Jones et al. on China does seem to be incorrect. Even if the new study had concluded the same as Jones et al., though, the central issue here—lack of research integrity—would remain valid.

7. A draft of my Report was sent to Wang, who replied as follows.

The only valid scientific issue described in your June 11, 2007 e-mailed pdf file ... concerning our 1990 GRL paper is the “station histories”, while others are strictly your own opinions and therefore irrelevant to your inquiry. So let me elaborate further on this issue.

Digitization of the hard copies of “station histories” was prepared in 1989-90 by Ms. Zhao-Mei Zeng (IAP/CAS) only for the 60-station network, while the “station histories” of other stations, including those we used in 1990 urban warming study, were available in paper form, as I have already indicated in my 4/30/07 e-mail to you. Therefore, the use of the word “fabrication” in your document is totally absurd.

Concerning the current status of these hard copies of “station histories”, Ms. Zeng told me when I was in Beijing in April 2007, that she no longer has the access to these information because it has been a long time (since 1990) and also IAP has moved office. ...

The reply is contradicted by the DOE/CAS report (Tao et al., 1991), which gives “the most comprehensive, long-term instrumental Chinese climate data presently available”. Moreover, Zeng is a co-author of the DOE/CAS report. Further information is adduced in my Report on Wang’s claims, in the Appendix.

### 3. CONCLUSIONS

Two conclusions are manifest. First, there is a serious lack of integrity in some of Wang’s research. Second, the insignificance of urbanization effects on temperature measurements has not been established as reliably as the IPCC (2007) assumes. Something else, more general, might also be argued: the failure of the scientific community to require data to be made available constitutes a serious departure from

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<sup>10</sup> IPCC (2007: ch.3) cites Li et al. (2004) to support its claim that urbanization effects are negligible in China. The conclusion of Li et al. is called into question by the study of Ren et al. (2007). Moreover, the statistical analysis of Li et al. is flawed (e.g. it incorrectly assumes that their model residuals are independent and does not correctly calculate error bars).

the transparency that is widely accepted to be a prerequisite for integrity in human affairs.<sup>11</sup>

*Note:* More recent events pertaining to the allegation against Wang will be listed at <http://www.informath.org/apprise/a5620.htm>.

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<sup>11</sup> As another example, Keenan (2007) exposed the work of Chuine et al. (2004), on Burgundy temperatures during the past six centuries, as being grossly incompetent at best, but only after a long struggle to obtain the data. For details, see <http://www.informath.org/apprise/a3200.htm>.

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- Wang W.-C., Zeng Z., Karl T.R. (1990), "Urban heat islands in China", *Geophysical Research Letters*, 17: 2377–2380.
- Yan Zhongwei, Yang Chi, Jones P. (2001), "Influence of inhomogeneity on the estimation of mean and extreme temperature trends in Beijing and Shanghai", *Advances in Atmospheric Sciences*, 18: 309–321. [The meteorological stations studied are #54511 and #58367.]

## **APPENDIX: FILED WITH THE UNIVERSITY AT ALBANY**

### **Wei-Chyung Wang fabricated some scientific claims**

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### **Introduction**

This report concerns two research papers co-authored by Wei-Chyung Wang, a professor at the University at Albany, State University of New York. The two papers are as follows.

Jones P.D., Groisman P.Y., Coughlan M., Plummer N., Wang W.-C., Karl T.R. (1990), "Assessment of urbanization effects in time series of surface air temperature over land", *Nature*, 347: 169–172.

Wang W.-C., Zeng Z., Karl T.R. (1990), "Urban heat islands in China", *Geophysical Research Letters*, 17: 2377–2380.

Each paper compares temperature data from some meteorological stations in China, over the years 1954–1983. (The first paper also considers data from stations in the USSR and Australia; Wang was only involved in Chinese data, and so the other stations are irrelevant here.) The first paper is quite important: it is cited for resolving a major issue in the most recent assessment report of the Intergovernmental Panel on Climate Change [IPCC, 2007].

### **Background**

Meteorological stations sometimes move, and this can affect the temperature measurements of the stations. For example, one of the stations relied upon by the above two papers was originally located on the upwind side of a city and later moved, 25 km, to be on the downwind side of the city. Such a move would be expected to increase the measured temperatures, because a city generates heat. Another station relied upon by the papers was originally located in the center of a city and then moved, 15 km, to be by the shore of a sea. Such a move would be expected to decrease the measured temperatures.

It is clear that when a station moves, the temperature data from before the move is not, in general, directly comparable to the data from after the move. This problem can occur even if the move is over a small distance. For example, if a station moves from being in the middle of a field to being by an asphalt area, then the measured temperatures would be expected to increase, even though the distance moved might be only 100 m. (A related issue is that the land use around a station can change over time, and this can affect measurements.)

In global warming studies, an important issue concerns the integrity of temperature measurements from meteorological stations. The latest assessment report from the IPCC indicates that the global average temperature rose by roughly 0.3 °C over the

period 1954–1983. Thus, if errors in temperature measurements were of similar size to, or larger than, 0.3 °C, there could be a serious problem for global warming studies. The papers of Jones et al. and Wang et al. both consider this issue. The paper of Jones et al. is one of the main works cited by the IPCC to support its contention that measurement errors arising from urbanization are tiny, and therefore are not a serious problem.

### **Fabrications**

Regarding station movements over time, the papers of Jones et al. and Wang et al. make the following statements.

The stations were selected on the basis of station history: we chose those with few, if any, changes in instrumentation, location or observation times. [Jones et al.]

They were chosen based on station histories: selected stations have relatively few, if any, changes in instrumentation, location, or observation times.... [Wang et al.]

Those statements are essential for the papers.

Each paper gives the same reference for its statement: a report resulting from a project done jointly by the U.S. Department of Energy (DOE) and the Chinese Academy of Sciences (CAS). The DOE/CAS report (available via <http://cdiac.esd.ornl.gov/ndps/ndp039.html>) resulted from concern over “possible CO<sub>2</sub>-induced climate changes”. Its purpose was to present “the most comprehensive, long-term instrumental Chinese climate data presently available”. It contains, in particular, histories of some Chinese meteorological stations, including the different locations of those stations and the dates on which they moved, if any.

The DOE/CAS report was formally published in full in 1991—Wang et al. and Jones et al. used a pre-publication version of the report. A revised version of the report was published in 1997, but the station histories are the same in the two versions.

Jones et al. and Wang et al. consider the same 84 meteorological stations in China. Regarding 49 of those stations, the DOE/CAS report says, “station histories are not currently available” and “details regarding instrumentation, collection methods, changes in station location or observing times ... are not known” (sect. 5). For those 49 stations, then, the above-quoted statements from the two papers are impossible.

Regarding the remaining 35 stations that were analyzed by the two papers, I have prepared a summary of the relevant information from the DOE/CAS report. The summary is available at <http://www.informath.org/apprise/a5620/b17.htm>. As an example from the summary, one station had five different locations during 1954–1983, with the locations as much as 41 km apart. Two other stations each had four different locations. At least half the stations had substantial moves (two other examples, of 25 km and 15 km, were given above). Moreover, several stations have histories that are inconsistent, making reliable analysis unattainable.

(The station that moved five times during the study period, #54511, is discussed by

Yan et al. [*Advances in Atmospheric Sciences*, 18: 309 (2001)]; the authors conclude that some of the moves affected temperature measurements by 0.4 °C. The authors also discuss another station, #58367, which had a single move of 4 km; the authors conclude that the move affected temperature measurements by 0.3 °C. The authors' statistical analysis, though, is invalid—e.g. it does not consider significance—so the conclusions are unproven.)

Additionally, the following statement from the DOE/CAS report seems apposite: “Few station records included in the PRC data sets can be considered truly homogeneous [i.e. have no significant changes in location, instrumentation, etc.]. Even the best stations were subject to minor relocations or changes in observing times, and many have undoubtedly experienced large increases in urbanization.”

The essential point here is that the quoted statements from Jones et al. and Wang et al. cannot be true and could not be in error by accident. The statements are fabricated.

### **Responsibility**

Who is responsible for the fabrication? Phil Jones is the lead author of one paper; so I asked him about the roles the different authors had. He replied as follows (17 May 2007).

In late 1989 or early 1990 I contacted the co-authors on the paper from 1990 to ask them about rural station data in their (three regions). The purpose of the study was to extend the work undertaken with Tom Karl a year or two early on the contiguous US.

Each of the three: Groisman (Russia), Plummer/Coughlan (Australia) and Wang (China) selected the rural stations in their region, based on their knowledge of the networks in those countries. Each had worked extensively on their respective networks. "For China there was the additional network of urban stations."

I did all the analyses with the data they provided. I wrote the first draft of the paper and they provided comments on subsequent drafts before it was submitted.

To further clarify things, I asked Jones the following: “Your message says “For China there was the additional network of urban stations”. Who was responsible for selecting the stations in that network? (Wang?)”. Jones replied, “Yes” (18 May 2007).

There is good evidence to support the version of events described by Jones. First, Jones is not a co-author of the paper of Wang et al., nor is he listed in the Acknowledgements section of the paper; so it seems very unlikely that he was responsible for the quoted statement in the paper. Second, the papers of Jones et al. and Wang et al. analyze the same data, but come to very different conclusions about that data (Wang et al. say, “The reasons for this are not clear”); the only explanation for the difference that I can think of is that Wang supplied the data to Jones—thereby meriting

co-authorship—but had little role in the analysis of that data, just as Jones says. Third, Wang was sent a draft of this report (on 11 June 2007), and he did not deny the version of events presented by Jones.

Given the above, and that Wang is the lead author of one paper, it seemed clear that Wang is the person responsible for the fabricated statements. So, on 11 April 2007, I e-mailed Wang, asking him “how did you ensure the quality of the data?”. Two days later, I telephoned Wang, but he declined to discuss things, saying “I’m in a meeting; can I get back to you?”.

On 20 April 2007, with still no response from Wang, I sent another e-mail. The e-mail asked Wang to, among other things, retract the paper of Wang et al. and also the claims made by Jones et al. for which he was responsible. Wang replied two days later, explaining that he was then in China, and that he would respond further when he returned. His reply also claimed “My understanding was that you are going to call me again, but you never did”.

On 30 April 2007, Wang e-mailed me the following.

The discussion with Ms. Zeng last week in Beijing have re-affirmed that she used the hard copies of station histories to make sure that the selected stations for the study of urban warming in China have relatively few, if any, changes in instrumentation, location, or observation times over the study period (1954–1983).

The “hard copies” to which Wang refers could not have been found by the authors of the DOE/CAS report, who endeavored to be comprehensive. Additionally, that report clearly shows that many of the stations used for the studies did have substantial changes in location.

Moreover, Zeng is one of the four authors of the DOE/CASE report; so what Wang now claims Zeng says is in contradiction to what Zeng wrote in 1991 and 1997. On the other hand, Zeng is a co-author of the paper of Wang et al. Why is Zeng a co-author of a paper that contradicts the DOE/CAS report? Perhaps she just went along with what the lead author, Wang, wanted—similar to how Wang is a co-author of Jones et al. even though Wang explicitly disagreed with the analysis of Jones. In any case, none of this would seem to remove the culpability of Wang. (Note: Zeng is not a co-author of the paper of Jones et al., nor is she mentioned in the Acknowledgements section of the paper.)

Finally, it should be noted that the DOE/CAS report was published as part of the Carbon Dioxide Research Program. The Chief Scientist of that program was Wang.

### **Additional considerations**

The problem with Jones et al. and Wang et al. was first raised on the Climate Audit blog of Stephen McIntyre (who exposed the “hockey stick” graph of temperatures over the past millennium). McIntyre noted that the stated claims about Chinese data seemed “absurd”. Indeed, for anyone familiar with Mao’s Great Leap Forward and the Cultural Revolution, the claim to have obtained substantial reliable data for 1954–1983 makes little sense.

During the Great Leap Forward, tens of millions of people are believed to have died, but it is not known *how many* tens of millions. And official records of grain harvests were often substantially exaggerated: this was not generally considered fraud, but instead making the records conform with “socialist reality”. During the Cultural Revolution, schools and universities were shut down and many intellectuals were beaten, internally exiled, or killed for being too bourgeois, and there was sometimes near-anarchy, especially in urban areas. Even as late as 1980, censuses were so poor that China’s population was only known to within about 100 million [Lavelly W.R., *Australian Journal of Chinese Affairs*, 18: 167 (1987)].

In other words, the claim to have gotten large numbers of highly-reliable, homogeneous records from the study period is a priori extremely difficult to believe.

Jones is a professor at a public university in the United Kingdom (the University of East Anglia); so any data held by him is requestable under the UK Freedom of Information Act. McIntyre and I each made formal requests under the Act, and by this means, obtained the list of meteorological stations that were used in the papers of Jones et al. and Wang et al. (see <http://www.cru.uea.ac.uk/cru/data/jonesetal1990/>). The Act was essential for this report.