



# **FRAUD, BIAS AND PUBLIC RELATIONS**

## **The 97% 'consensus' and its critics**

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**The Global Warming Policy Foundation**

GWPF Note 11



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## About the author

Andrew Montford is the author of *The Hockey Stick Illusion: Climategate and the Corruption of Science* (2010) and of the GWPF reports 'The Climategate Inquiries' (2010) and 'Nullius in Verba: The Royal Society and Climate Change' (2012). He writes a blog specialising in climate change issues at [www.bishop-hill.net](http://www.bishop-hill.net) and has made many media appearances discussing global warming from a sceptic perspective.

## 1 Summary

Recent reports that 97% of published scientific papers support the so-called consensus on man-made global warming are based on a paper by John Cook et al.<sup>1</sup>

Precisely what consensus is allegedly being supported in these papers cannot be discerned from the text of the paper. An analysis of the methodology used by Cook et al. shows that the consensus referred to is trivial:

- that carbon dioxide (CO<sub>2</sub>) is a greenhouse gas
- that human activities have warmed the planet to some unspecified extent.

Almost everybody involved in the climate debate, including the majority of sceptics, accepts these propositions, so little can be learned from the Cook et al. paper.

Numerous critiques of the paper have been published, some by supporters of mainstream views on climate science. These have demonstrated substantial biases in the methodology. Cook has certainly misrepresented what his research shows. More importantly, one researcher has made an allegation of scientific fraud, at this point un rebutted by Cook and his colleagues.

## 2 The paper

It has been repeatedly stated that 97% of scientists agree that global warming is real and man-made. These claims are based on a paper published by John Cook et al. in the journal *Environmental Research Letters*.<sup>2</sup>

The authors are all associated with the controversial global warming activist website *Skeptical Science*. Their conclusions were as follows:

Among abstracts expressing a position on AGW [Anthropogenic Global Warming], 97.1% endorsed the consensus position that humans are causing global warming.

The paper received an extraordinary reception, being downloaded tens of thousands of times in the first few days after it was published, and receiving hundreds of

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<sup>1</sup>This paper updates an earlier GWPF note entitled 'Consensus, What Consensus?', incorporating recent critiques of the Cook et al study.

<sup>2</sup>Cook, J et al. 'Quantifying the consensus on anthropogenic global warming in the scientific literature.' *Environmental Research Letters* 2013; 8 024024

citations from around the internet. It was even referred to on President Obama's Twitter feed:<sup>3</sup>

@BarackObama: Ninety-seven percent of scientists agree: #climate change is real, man-made and dangerous.

It should be noted that the Obama statement misrepresented the Cook et al. paper, which said nothing about global warming being dangerous and which was based on analysis of published abstracts rather than the opinions of scientists. This confusion over exactly what the paper was about also seemed to affect Ed Davey, the Secretary of State for Energy and Climate Change, who cited it in an interview with the BBC's Andrew Neil:

We've had a complete unchallenged view of the climate change deniers. I think we need to have rather more balance in the debate, particularly when we saw a recent analysis of 12,000 scientific papers...and of the scientists who expressed a view – these were climate change papers – of the scientists who expressed a view 97% said that climate change was happening and that it was human-made activity.<sup>4</sup>

### 3 Planning

The amount of media attention the paper received is unsurprising given that the paper appears to have been written for this express purpose. In early 2012, a security lapse at the *Skeptical Science* website led to an internal forum for its staff being exposed to public view. Among the contents were several discussions about what became the Cook et al. paper.

In one exchange, Cook stated that the purpose of the paper was to establish the existence of a consensus:

It's essential that the public understands that there's a scientific consensus on AGW. So [*Skeptical Science* activists] Jim Powell, Dana [Nuccitelli] and I have been working on something over the last few months that we hope will have a game changing impact on the public perception of consensus. Basically, we hope to establish that not only is there a consensus, there is a strengthening consensus.<sup>5</sup>

Another participant expressed concerns about the fact that the marketing of the paper was being planned before the research itself:

...I find this planning of huge marketing strategies somewhat strange when we don't even have our results in and the research subject is not that revolutionary either (just summarizing existing research).

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<sup>3</sup> Although note that the Obama Twitter account is operated by an activist group called Organising for Action. Their work is endorsed by Obama, but the majority of the tweets on the BarackObama account, including the one in question, are not issued by the president in person.

<sup>4</sup> <http://www.bbc.co.uk/news/uk-politics-23405202>.

<sup>5</sup> <http://www.populartechnology.net/2013/06/cooks-97-consensus-study-game-plan.html>.



These comments suggest that the project was not a scientific investigation to determine the extent of agreement on global warming, but a public relations exercise.

## 4 Methodology

The methodology used by Cook et al. was to obtain a list of scientific papers on the subject of climate change and to assess the extent of endorsement of the global warming hypothesis of each one based on a reading of its abstract. Although the paper described those rating the papers as 'the independent rating team', in fact the task was taken on by a team of volunteer activists from amongst the *Skeptical Science* community, many of whom were also co-authors of the paper.

The definition of what exactly was being endorsed by the papers was problematic for the author team, since there is widespread agreement, including among most sceptics, that carbon dioxide is a greenhouse gas and that humankind is therefore capable of warming the planet. The main focus of debate is over how much warming might take place.

However, the vast majority of scientific papers on global warming do not take a position on this question, so the idea of determining the extent of any consensus by a comprehensive review of the literature in the field was something of a nonsense. Cook and his colleagues were well aware of this problem and therefore appear to have decided to adopt a definition of the consensus that was deliberately vague – 'that humans are causing global warming'. In the discussion on the *Skeptical Science* forum, this was called the 'porno' approach:

Okay, so we've ruled out a definition of AGW being 'any amount of human influence' or 'more than 50% human influence'. We're basically going with Ari's porno approach (I probably should stop calling it that) which is AGW = 'humans are causing global warming'. e.g. – no specific quantification which is the only way we can do it considering the breadth of papers we're surveying.<sup>6</sup>

## 5 The shallow consensus

The formulation 'that humans are causing global warming' could have two different meanings. A 'deep' consensus reading would take it as all or most of the warming is caused by humans. A 'shallow' consensus reading would imply only that some unspecified proportion of the warming observed is attributable to mankind.

Differences over extent of any human influence is the essence of the climate debate. The vast majority of those involved – scientists, economists, commentators, activists, environmentalists and sceptics – accept that carbon dioxide is a greenhouse gas that will, other things being equal, warm the planet. But whether the effect is large or small is unknown and the subject of furious debate. The IPCC's Fifth Assessment Report shows a range of figures for effective climate sensitivity – the amount of warming that can be expected from a doubling of carbon dioxide levels. At one end are studies

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<sup>6</sup><http://rankexploits.com/musings/2013/the-saga-continues/>.

based on observations and suggesting little more than 1 °C of warming per doubling. If true, this would mean that climate change was inconsequential. At the other end are estimates based on computer simulations, which would, if realised, be disastrous.

It is possible to show that when Cook and his colleagues say that there is consensus of the proposition that 'humans are causing global warming', they are adopting the shallow definition. According to the protocols used by the volunteers who rated the abstracts, a paper was said to endorse the consensus if it accepted the concept of anthropogenic global warming, either implicitly or explicitly, and regardless of whether it quantified the extent of human influence on the planet's temperature. Most papers on mitigation appear to have been taken to implicitly endorse the consensus,<sup>7</sup> although some seem to have been rated as neutral. A paper was only said to reject the consensus if it minimised the human contribution, for example by proposing that natural mechanisms dominate or, more explicitly, suggested that the human contribution is minimal.

There was therefore an asymmetry in the classifications, with papers accepting the influence of a large or an unspecified level of human influence included in the consensus and only those actively minimising the human influence recorded as rejecting it. For example, the guidance given to the volunteer raters suggests that an abstract containing the words 'Emissions of a broad range of greenhouse gases of varying lifetimes contribute to global climate change' should be taken as explicit but unquantified endorsement of the consensus. Clearly the phrase quoted could imply any level of human contribution to warming. This leads to the unavoidable conclusion that the consensus as revealed by Cook et al. was indeed the shallow one.

This understanding of the Cook paper is confirmed by some surprising categorisations of individual papers, with publications by the most prominent critics of mainstream climate science said to endorse the consensus. For example, a paper by Nir Shaviv,<sup>8</sup> in the past described by *Skeptical Science* as a 'denier',<sup>9</sup> was classified as 'Explicitly endorses but does not quantify or minimise' global warming. Shaviv has rejected this classification of his work entirely:

...it is not an accurate representation [of my work]. The paper shows that...climate sensitivity is low...I couldn't write these things more explicitly in the paper because of the refereeing, however, you don't have to be a genius to reach these conclusions from the paper.<sup>10</sup>

Similarly, Alan Carlin, formerly of the US Environmental Protection Agency, has criticised Cook et al.'s classification of his paper as explicitly endorsing, but not minimising global warming, noting that the abstract makes clear his belief that carbon dioxide will produce very little warming:

The economic benefits of reducing CO<sub>2</sub> emissions may be about two orders of magnitude less than those estimated by most economists because the climate

<sup>7</sup>The guidance to raters suggests that the words 'carbon sequestration in soil is important for mitigating global climate change' should be taken as implicit endorsement.

<sup>8</sup>Shaviv, who works at the Hebrew University of Jerusalem, is a member of the GWPF Academic Advisory Council.

<sup>9</sup><http://www.skepticalscience.com/examining-the-latest-climate-denialist-plea-for-inaction.html>.

<sup>10</sup><http://www.populartechnology.net/2013/05/97-study-falsely-classifies-scientists.html>.

sensitivity factor...is much lower than assumed by the United Nations because feedback is negative rather than positive and the effects of CO<sub>2</sub> emissions reductions on atmospheric CO<sub>2</sub> appear to be short rather than long lasting.<sup>11</sup>

The treatment of the Shaviv paper is particularly interesting: its author did not actively downplay global warming in the text because this would have made it difficult to get the paper through peer review. So because of this silence on the extent of manmade influence, its classification as endorsing the consensus was correct according to the protocol set out for the raters.

It can be seen from these comments that both these authors accept that carbon dioxide is a greenhouse gas, but believe that climate sensitivity – the amount of warming we should expect – is low. The example of endorsement given in the guidelines – ‘Emissions of a broad range of greenhouse gases of varying lifetimes contribute to global climate change’ – would not have been contradictory in either paper. Again, one is left with the impression that the classification was correct, confirming the shallow nature of the consensus.

## 6 Cook’s data

Analysis of Cook’s work has been severely hampered by his procrastination and ultimate refusal to release all of the data associated with the study. Cook had arranged for his team to rate each paper more than once to provide some reassurance that different people were approaching the task in the same way. The economist Richard Tol, who wanted to test the paper’s findings, asked Cook for the ratings given by individual researchers for each paper, as well as information about when the rating was made, so that he could assess how many papers each rater was getting through and how quickly.<sup>12</sup>

Tol was told, implausibly, that he could not have this information immediately since it was necessary to anonymise the data to protect the identities of the raters and the scientists who had responded to the subsequent survey. It was also said that timestamps were not collected as this information would have been irrelevant.

However, some weeks after Tol had been rebuffed, blogger Brandon Shollenberger discovered Cook’s data on an unsecured website operated by the University of Queensland. When the university became aware that the data were out in the open, one of its legal officers wrote to Shollenberger threatening legal action if the data were disseminated or, extraordinarily, if the existence of this threat was revealed. When Shollenberger publicised the threats anyway, the university responded with a press release which claimed that they had only withheld information that would allow participants to be identified, in accordance with confidentiality agreements they had entered into with third parties. They had done this, they said, in accordance with the ethical clearance for the research project.<sup>13</sup>

<sup>11</sup><http://www.populartechnology.net/2013/05/97-study-falsely-classifies-scientists.html>.

<sup>12</sup>[http://www.skepticalscience.com/docs/24\\_errors.pdf](http://www.skepticalscience.com/docs/24_errors.pdf).

<sup>13</sup><http://www.uq.edu.au/news/article/2014/05/uq-and-climate-change-research>.

After some weeks considering his options, Shollenberger decided to ignore the university's threats and he published the data. At this point the reasons for the university's blundering actions became clear: Cook's data revealed that the excuses given to Tol were not true. The date of the each rating was included in his data, although the time was not, and the data files did not include the raters' names at all – only an identity number.<sup>14</sup> Cook's embarrassment was increased further when some of his emails were published under Information Privacy legislation. One message revealed that a year prior claiming that timestamps were not collected, he had told a colleague that although *Environmental Research Letters* had said that he didn't have to give Tol the timestamp information he would probably do so anyway. Another request, this time for a copy of the ethical approval and confidentiality agreements the university had mentioned, showed that no such document existed;<sup>15</sup> the university's press release had therefore contained a number of falsehoods.

In addition, the data showed that raters had distinctly different tendencies to issue particular ratings. When combined with the fact that they also rated very different numbers of paper, there was clear evidence of a bias in the results. There was also apparently a problem with the number of papers processed by raters, with one participant getting through no fewer than 765 abstracts in a 72-hour period.

The dated ratings also revealed that there was a 7-week break in rating activity, during which time the raters had the opportunity to study their previous results. Analysis of the two periods showed that there was a statistically significant difference in the ratings before and after the break. The published paper makes clear that, after the ratings were completed, the classification system was altered and a sample of abstracts re-classified accordingly. Researchers normally try to avoid this kind of practice, as it may consciously or unconsciously steer the result in a particular direction.<sup>16</sup>

## 7 Critiques

Since it was published in 2013, there have been many critiques of the Cook et al. paper. Some of these have come from sceptics, but mainstream climatologists and experts from outside the climate debate have also voiced damning opinions of the study.

### Richard Tol

Still without access to Cook's data, Richard Tol had to publish his comment without having completed his analysis. However, there were still many issues that could be addressed. Unfortunately, *Environmental Research Letters* would not publish the critique, and it appeared in another journal.<sup>17</sup> Tol explained some of the problems with Cook's work.

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<sup>14</sup><http://hiizuru.wordpress.com/2014/07/20/its-time/>.

<sup>15</sup>There appeared to have been an attempt to piggyback on the ethical approval given to another project.

<sup>16</sup>Tol R. Pers. comm.

<sup>17</sup>Tol, RSJ. 'Quantifying the consensus on anthropogenic global warming in the literature: A re-analysis'. *Energy Policy* 2014; 73: 701–705.

Reported results are inconsistent and biased. The sample is not representative and contains many irrelevant papers. Overall, data quality is low. Cook's validation test shows that the data are invalid. Data disclosure is incomplete so that key results cannot be reproduced or tested.

This was soon followed by a response from Cook,<sup>18</sup> which somewhat intriguingly began by referring to the consensus being over 'AGW' rather than over any specific extent of human influence on the climate. However, within a few lines this had changed to a claim that abstracts had been categorised 'based on the level of endorsement that *most of the recent global warming is man-made*' [my emphasis]. This, he claimed, was based on abstracts that fell into the following categories:

1. Explicit endorsement with quantification...
2. Explicit endorsement without quantification...
3. Implicit endorsement: Implies humans are causing global warming. E.g., research assumes greenhouse gas emissions cause warming without explicitly stating humans are the cause.

It is of course absurd to suggest that papers that were categorised as *not* quantifying the extent of human influence could be said to endorse the idea that most of the warming was manmade.<sup>19</sup>

Cook's response was followed in turn by a rejoinder from Tol,<sup>20</sup> which suggested that it was possible to demonstrate confirmation bias in the ratings. In the light of the release of Cook's data, Tol has made further attempts to persuade *Environmental Research Letters* to publish a comment, but the journal has so far failed to respond.

## Legates et al

David Legates and colleagues addressed Cook's paper as part of their published comment<sup>21</sup> on a related paper by Bedford et al. In it they criticised Cook's findings, noting that it depended on seamlessly interchanging three different and mutually exclusive definitions of the consensus...

- The unquantified definition: 'The consensus position that humans are causing global warming'
- The standard definition: ...that 'human activity is very likely causing most of the current warming' ...and
- The catastrophist definition: That our enhancement of the greenhouse effect will be dangerous enough to be 'catastrophic' ...

<sup>18</sup>Cook, J et al. 'Reply to "Quantifying the consensus on anthropogenic global warming in the scientific literature: A re-analysis"'. *Energy Policy* 2014; 73: 706–708.

<sup>19</sup>Cook had misrepresented his findings in other papers too. See Bedford D and Cook J. Agnotology, scientific consensus, and the teaching and learning of climate change: A response to Legates, Soon and Briggs. *Science and Education* 2013; 22: 2019–2030.

<sup>20</sup>Tol, RSJ. 'Quantifying the consensus on anthropogenic global warming in the literature: Rejoinder'. *Energy Policy* 2014; 73: 709.

<sup>21</sup>Legates, DR, et al. 'Learning and teaching climate science: The perils of consensus knowledge using agnotology'. *Science & Education* 2013; 22: 2007–2017.

They went on to note that it was impossible to determine from the paper to what extent the abstracts examined by Cook and his colleagues supported the standard definition. However, examination of Cook's data suggested that only 41 of the 11,944 abstracts examined actually did so.

## **José Duarte**

José Duarte, a social psychologist at Arizona State University and a self-described supporter of consensus positions on climate change, wrote a detailed and outspoken critique of the paper at his website,<sup>22</sup> saying that a paper based on rating of journal abstracts by activists was:

...completely invalid and untrustworthy (and by customary scientific standards, completely unpublishable.) I had no idea this was happening. This is garbage, and a crisis. It needs to stop, and [such] papers need to be retracted immediately, especially Cook, et al (2013).

Duarte looked at several aspects of Cook's work, setting out what he said was evidence of scientific fraud:

Examples of the unbelievable bias and transparent motives of the raters in Cook, et al (2013) below. These are excerpts from an online forum where the raters apparently collaborated with each other in their ratings. It's worse than that – the first example is evidence of fraud if this was during the operational rating period. If it was during training, it's practice for fraud.

He also pointed out that the hostility of the *Skeptical Science* team to sceptics was enough on its own to entirely invalidate the study:

...these people aren't going to be borderline cases. They're extreme...They're at war. They really hate dissenters...Their worldview is extremely binary and hostile – most environmentalists are quite a bit more moderate and less hateful than they are. They're a pretty special population. Some of the scientists whose papers they rated had already been savaged on their crazy website...we now know the 'study' was a political operation from start to finish. We have explicit evidence...that raters cheated, were incredibly biased against dissenting scientists and were even alert for their papers, and that some raters were pretty much willing to code anything as endorsement.

## **Mike Hulme**

Professor Mike Hulme is one of the UK's most senior climate scientists, having been one of the founders of the Tyndall Centre, the UK's national climate research institute. His comment on the Cook et al paper was as follows:

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<sup>22</sup>Duarte, J. Ignore climate consensus studies based on random people rating journal article abstracts. <http://www.joseduarte.com/blog/ignore-climate-consensus-studies-based-on-random-people-rating-journal-article-abstracts>

The [Cook et al.] article is poorly conceived, poorly designed and poorly executed. It obscures the complexities of the climate issue and it is a sign of the desperately poor level of public and policy debate in this country that the energy minister should cite it. It offers a similar depiction of the world into categories of 'right' and 'wrong' to that adopted in [an earlier study]: dividing publishing climate scientists into 'believers' and 'non-believers'. It seems to me that these people are still living (or wishing to live) in the pre-2009 world of climate change discourse. Haven't they noticed that public understanding of the climate issue has moved on?<sup>23</sup>

## 8 Conclusions

While Cook's approach appears to owe more to public relations or propaganda than the scientific method, there is little doubt that there is a scientific consensus, albeit not the one that the authors of the paper have led people to believe exists. The consensus as described by Cook et al. is virtually meaningless and tells us nothing about the current state of scientific opinion beyond the trivial observation that carbon dioxide is a greenhouse gas and that human activities have warmed the planet to some unspecified extent. The figure of 97% is entirely discredited, whatever the nature of the consensus.

However, the allegations that have been made against Cook's study in recent months, with an array of experts criticising the conception, the methodology and the integrity of the research, put his conclusions in a very different light. With a very public and un-rebutted allegation of scientific fraud hanging over it, the case for the 97% consensus looks shaky indeed.

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<sup>23</sup><http://blogs.nottingham.ac.uk/makingsciencepublic/2013/07/23/whats-behind-the-battle-of-received-wisdoms/>.











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Our main focus is to analyse global warming policies and their economic and other implications. Our aim is to provide the most robust and reliable economic analysis and advice. Above all we seek to inform the media, politicians and the public, in a newsworthy way, on the subject in general and on the misinformation to which they are all too frequently being subjected at the present time.

The key to the success of the GWPF is the trust and credibility that we have earned in the eyes of a growing number of policy makers, journalists and the interested public. The GWPF is funded overwhelmingly by voluntary donations from a number of private individuals and charitable trusts. In order to make clear its complete independence, it does not accept gifts from either energy companies or anyone with a significant interest in an energy company.

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Published by the Global Warming Policy Foundation

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