

July 9, 2019

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Re: Information Quality Act Correction Request Regarding NASA's Claim that 97 Percent of Scientists Agree on Anthropogenic Global Warming

The Competitive Enterprise Institute (CEI) submits this request for correction under the Information Quality Act (IQA), 114 Stat. 2763, section 515, as implemented through National Aeronautics and Space Administration and Office of Management and Budget (OMB) guidelines. These guidelines were expanded by OMB in a memorandum issued on April 24, 2019.¹ The information we seek to have corrected is the claim, on NASA's website, that 97% of climate scientists agree that humans are responsible for global warming.

We expect a response to this request for correction (RFC) within 120 days. Under OMB's new requirements, **"agencies will not take more than 120 days to respond to an RFC without the concurrence of the party that requested the request for correction."** In addition, the new OMB guidelines require that, "The agency response should contain a point-by-point response to any data quality arguments contained in the RFC and should refer to a peer review that directly considered the issue being raised, if available." Furthermore, "[a]gencies should share draft responses to RFCs and appeals with OMB prior to release to the requestor for assessment of compliance with the above norms." Thus, responses to correction requests now need to be reviewed in advance by OMB sufficiently in advance of the 120-day deadline.

We ask NASA to determine that the claim that "[n]inety-seven percent of climate scientists agree that climate-warming trends over the past century are extremely likely due to human activities" violates the IQA. As is shown below, that claim is not objective; it is neither accurate nor reliable nor unbiased. This claim appears on the NASA web page titled "Climate Change: How Do We Know?" among others.²

¹ Executive Office of the President, Memorandum for the Heads of Executive Departments and Agencies, M-19-15, April 24, 2019, <https://www.whitehouse.gov/wp-content/uploads/2019/04/M-19-15.pdf>.

² National Aeronautics and Space Administration, "Climate Change: How Do We Know?" Global Climate Changes: Vital Signs of the Planet, accessed June 27, 2019, <https://climate.nasa.gov/evidence/>.

This claim has been widely criticized. Examples of scientific peer-reviewed criticism include:

- Richard Tol, “Quantifying the consensus on anthropogenic global warming in the literature: A re-analysis.”³ As the abstract of this article states in part:
 - A claim has been that 97% of the scientific literature endorses anthropogenic climate change. This claim, frequently repeated in debates about climate policy, does not stand. A trend in composition is mistaken for a trend in endorsement. Reported results are inconsistent and biased. (Citations removed.)
- Richard Tol, “Comment on ‘Quantifying the consensus on anthropogenic global warming in the scientific literature.’”⁴
 - [The claim] omits tests for systematic differences between raters. Many abstracts are unaccounted for.
- David R. Legates, Willie Soon, William M. Briggs, Christopher Monckton, “Climate Consensus and ‘Misinformation’: A Rejoinder to Agnotology, Scientific Consensus, and the Teaching and Learning of Climate Change, Science & Education.”⁵ One key conclusion of their analysis is that:
 - “[I]nspection of a claim ... of 97.1% consensus ... shows just 0.3% endorsement of the standard definition of consensus: that most warming since 1950 is anthropogenic.” (Citations removed.)

A number of experts have also criticized the claim in non-peer-reviewed publications, such as:

- Roy Spencer (U.S. Science Team leader for the Advanced Microwave Scanning Radiometer (AMSR-E) on NASA’s Aqua satellite and principal research scientist at the University of Alabama in Huntsville), “The myth of the 97 percent global warming consensus”⁶
- Neil L. Frank (meteorologist, former director of the National Hurricane Center in Florida), “What’s Wrong with the Claim that ‘97% of Climate Scientists Agree’ about Global Warming?”⁷

³ Richard Tol, “Quantifying the consensus on anthropogenic global warming in the scientific literature: A re-analysis,” *Energy Policy*, Vol. 73 (October 2014), pp. 701-705, <https://www.sciencedirect.com/science/article/pii/S0301421514002821>.

⁴ Tol, “Comment on ‘Quantifying the consensus on anthropogenic global warming in the scientific literature,’” *Environmental Research Letters*, Vol. 11 (2016), <https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048001>.

⁵ David R. Legates, Willie Soon, William M Briggs, and Christopher Monckton, “Climate Consensus and ‘Misinformation:’ A Rejoinder to Agnotology, Scientific Consensus, and the Teaching and Learning of Climate Change,” *Science & Education*, Vol. 24, Issue 3, 299-318 (April 2015), <https://link.springer.com/article/10.1007%2Fs11191-013-9647-9>.

⁶ Roy Spencer, “The myth of the 97 percent global warming consensus,” Alabama.com, March 31, 2016, https://www.al.com/opinion/2016/03/the_myth_of_the_97_percent_glo.html.

⁷ Neil L. Frank, “What’s Wrong with the Claim that ‘97% of Climate Scientists Agree’ about Global Warming?” <https://cornwallalliance.org/2017/06/whats-wrong-with-the-claim-that-97-of-climate-scientists-agree-about-global-warming/>

- David Henderson (economist, formerly on the President’s Council of Economic Advisers), “1.6%, Not 97%, Agree that Humans are the Main Cause of Global Warming”⁸

Many other commentators have also criticized the claim:

- Alex Epstein, “‘97% of Climate Scientists Agree’ Is 100% Wrong”⁹
- Ian Tuttle, “The 97 Percent Solution”¹⁰
- Justin Fox, “97 Percent Consensus on Climate Change? It’s Complicated”¹¹
- Michael Bastasch, “Where did ‘97 Percent’ Global Warming Consensus Figure Come From?”¹²

In support of its 97% statement, NASA cites five studies; two by John Cook, and others by William Anderegg, Peter Doran, and Naomi Oreskes. But as shown below, none of these studies adequately support the claim.

The oldest study cited by NASA is the study by history professor Naomi Oreskes. But as pointed out below, due to criticism Oreskes had to issue a formal correction. The Doran and Anderegg studies examined different aspects—a survey and public statements, respectively. However, those authors acknowledge that these methods cannot determine the overall percentage of scientist who agree. The Cook study was in many ways an attempt to redo the original Oreskes study with a broader and more complete scope and without the problem that required formal correction by Oreskes. Many of the scientists whose papers were evaluated by Cook claim their research was inaccurately categorized, which raises basic questions about the study’s reliability.¹³

As the Cook et al. study is the most recent, and the most cited, this request for correction will start with it, focusing first on the original 2013 study and then the 2016 response to criticism. After that, each study will be examined in reverse chronological order.

⁸ David Henderson, “1.6%, Not 97%, Agree that Humans are the Main Cause of Global Warming,” EconLog, The Library of Economics and Liberty, Liberty Fund, May 14, 104, https://www.econlib.org/archives/2014/03/16_not_97_agree.html.

⁹ Alex Epstein, “‘97% of Climate Scientists Agree’ Is 100% Wrong,” Forbes.com, January 6, 2015, <https://www.forbes.com/sites/alexepstein/2015/01/06/97-of-climate-scientists-agree-is-100-wrong/>.

¹⁰ Ian Tuttle, “The 97 Percent Solution,” National Review Online, October 8, 2015, <https://www.nationalreview.com/2015/10/climate-change-no-its-not-97-percent-consensus-ian-tuttle/>.

¹¹ Justin Fox, “97 Percent Consensus on Climate Change? It’s Complicated,” Bloomberg, June 14, 2017, <https://www.bloomberg.com/opinion/articles/2017-06-15/97-percent-consensus-on-climate-change-it-s-complicated>.

¹² Michael Bastasch, “Where did ‘97 Percent’ Global Warming Consensus Figure Come From?” Daily Caller, May 16, 2014, <https://dailycaller.com/2014/05/16/where-did-97-percent-global-warming-consensus-figure-come-from/>.

¹³ “97% Study Falsely Classifies Scientists’ Papers, according to the scientists that published them,” Popular Technology, May 21, 2013, <http://www.populartechology.net/2013/05/97-study-falsely-classifies-scientists.html>.

1. The 2013 Cook Study

In this study,¹⁴ Cook and his team collected all published peer-reviewed papers from 1991 through 2011 that use the terms “global warming” or “global climate change.” Those totaled 11,944 papers. The Cook team then examined the title and abstract of each paper and based only on that (no examination of the body of the article), and attempted to classify each paper as one of the following categories:

- (1) Explicit endorsement with quantification;
- (2) Explicit endorsement without quantification;
- (3) Implicit endorsement;
- (4a) No position;
- (4b) Uncertain;
- (5) Implicit rejection;
- (6) Explicit rejection with qualification; and
- (7) Explicit rejection without qualification.

The authors report the following results:

- 64 papers explicitly endorsed anthropogenic global warming (AGW) with quantification (affirming that at least half of the global warming is due to humans),
- 922 papers explicitly endorsed AGW without quantification (affirming that humans cause global warming to some unspecified degree)
- 2910 papers implicitly endorsed AGW (e.g., “carbon sequestration in soil is important for mitigating global climate change”)
- 7930 papers did not state a position on AGW
- 40 papers were uncertain as to AGW
- 54 papers implicitly rejected AGW (affirming the possibility for natural causes to explain the increase in temperature)
- 15 papers explicitly rejected AGW without quantification (affirming that there is little support for catastrophic global warming)
- 9 papers explicitly rejected AGW with quantification (affirming that the human contribution to global warming is negligible)

The paper then added the first three categories together (3,896 papers) and compared that to the sum of the last three categories (78 papers) plus studies expressing uncertainty (40 papers). In short, 4,014 papers ($3896 + 78 + 40 = 4014$), expressed or implied a position on AGW. Of these 3,896 or 97% supposedly affirmed the consensus view. But this was 97% of abstracts of papers in which a position was taken. But this total did not include the 66.4% of all papers that did not

¹⁴ John Cook, Dana Nuccitelli, Sarah A Green, Mark Richardson, Bärbel Winkler, Rob Painting, Robert Way, Peter Jacobs, and Andrew Skuce, “Quantifying the consensus on anthropogenic global warming in the scientific literature,” *Environmental Research Letters*, Vol. 8 (2013), <https://iopscience.iop.org/article/10.1088/1748-9326/8/2/024024>.

take a position (4a). In other words, at most, Cook et al. found that about one-third of peer-reviewed papers containing the search terms “global warming” or “global climate change” endorse the consensus viewpoint—a far cry from 97%.

As noted earlier, many of the scientists whose papers were categorized as supporting AGW dispute the accuracy of that categorization:

- “[S]urvey included 10 of my 122 eligible papers. 5/10 were rated incorrectly. 4/5 were rated as endorse rather than neutral.” —Dr. Richard Tol¹⁵
- “That is not an accurate representation of my paper.” —Dr. Craig Idso¹⁶
- “Nope ... it is not an accurate representation.” —Dr. Nir Shaviv¹⁷
- “Cook et al. (2013) is based on a strawman argument.” —Dr. Nicola Scafetta¹⁸

Legates’s peer-reviewed independent study reevaluating the 64 articles that Cook said explicitly endorsed AGW (that more than half of the warming was caused by humans) found that actually only 41 made such claims.¹⁹

Of the categories evaluated by the Cook study, only explicit endorsement with quantification supports the NASA statement that humans are the primary cause of global warming rather than merely a small factor. In other words, according to the Cook team’s own data, only 0.5% of the papers reviewed support the NASA claim (64 of 11,944). The Cook researchers actually found more papers skeptical of NASA’s statement than those supporting NASA’s claim.

Additionally, the study did not include the 64.6% of the authors who took no position on anthropogenic global warming (4a). As such, this study cannot be used to draw a conclusion about the views of these scientists. It does not show, as claimed by NASA, that these 64.6% scientists support the conclusion “that climate-warming trends over the past century are extremely likely due to human activities.”

Cook et al. also emailed 8,547 paper authors to obtain additional information on their AGW views. Only 14% of the authors responded. Of those who responded, 62.7% self-described themselves as endorsing AGW, 35.5% stated they had no position, and 1.8% rejected AGW. If one considers only those that responded with a position ($62.7 + 1.8 = 64.5\%$ of the total), this produces the 97% figure ($62.7/64.5 = 97\%$). However, this data does not support any claim concerning the 35.5% of scientists who took no position on AGW. Nor does the data support any claim concerning the 86% who did not respond. The data does not include all climate scientists, only those that were willing to respond and who explicitly stated they had a position on the issue.

¹⁵ Richard Tol, Twitter post, May 22, 2013, 1:43 AM, <https://twitter.com/richardtol/status/337126632080957441>.

¹⁶ Popular Technology, *supra* note 14.

¹⁷ *Ibid.*

¹⁸ *Ibid.*

¹⁹ Legates et al, *supra* note 5.

As such, this paper does not support NASA's claim. Nor can it be used to argue those who declined to respond or took no position concur with this view.

2. The 2016 Paper by Cook

This paper²⁰ responded to criticism by Richard Tol.²¹ Tol had noted that it was inappropriate to assume that a “no-position” statement actually endorsed anthropogenic global warming. Cook responded by accusing Tol of the opposite error—that is, equating no position with rejection of the AGW thesis:

[The Cook 2013 paper] omitted abstracts that did not state a position on AGW to derive its consensus estimate of 97%. ... In contrast, in one analysis, Tol (2016) effectively treats no-position abstracts as rejecting AGW, thereby deriving consensus values less than 35%.

Cook rejects “Equating no-position papers with rejection.” As Cook notes, it is inappropriate to take no-position abstracts as rejecting anthropogenic global warming. But, for the same reason, it is inappropriate to take such “no-position” statements as endorsing anthropogenic global warming.

But what Cook objects to is exactly what NASA has done—it takes the “no-position” statements by various scientists as endorsing a specific position. It is inappropriate to make such a conclusion either way without evidence.

3. The 2010 Anderegg Study

This study attempted to survey the field of climate research by sorting scientists into two groups, those the author claimed were supporters of anthropogenic global warming (Group A), and public opponents anthropogenic global warming in (Group B):

- A. Group A consisted of members of:
 - a. The United Nations Intergovernmental Panel on Climate Change AR4 Working Group I Contributors (coordinating lead authors, lead authors, and contributing authors; 619 names listed);
 - b. 2007 Bali Declaration signers (212 names listed);
 - c. Canadian Meteorological and Oceanographic Society (CMOS) 2006 statement (120 names listed);
 - d. CMOS 2008 statement (130 names listed); and
 - e. 37 signers of open letter protesting The Great Global Warming Swindle film.

²⁰ John Cook, Naomi Oreskes, Peter T Doran, William R L Anderegg, Bart Verheggen, Ed W Maibach, J. Stuart Carlton, Stephan Lewandowsky, Andrew Skuce, and Sarah A Green, “Consensus on consensus: a synthesis of consensus estimates on human-caused global warming,” *Environmental Research Letters*, Vol. 11 (2016), <https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002>.

²¹ Tol, “Comment on 'Quantifying the consensus on anthropogenic global warming in the scientific literature.'”

After removing duplicates the list had 903 names.

B. Group B consisted of signers of:

- a. The 1992 statement from the Science and Environmental Policy Project (46 names);
- b. 1995 Leipzig Declaration (80 names);
- c. 2002 letter to Canadian Prime Minister Jean Chretien (30 names);
- d. 2003 letter to Canadian Prime Minister Paul Martin (46 names);
- e. 2006 letter to Canadian Prime Minister Stephen Harper (61 names);
- f. 2007 letter to U.N. Secretary General Ban Ki-Moon (100 names);
- g. NIPCC: 2008 Heartland Institute document “Nature, Not Human Activity, Rules the Climate, (24 listed contributors);
- h. 2008 Manhattan Declaration from a conference in New York City (206 names listed as qualified experts);
- i. 2009 newspaper ad by the Cato Institute challenging President Obama’s stance on climate change (115 signers);
- j. 2009 Heartland Institute document “Climate Change Reconsidered: 2009 Report of the Nongovernmental Panel on Climate Change (NIPCC)” (36 authors);
- k. 2009 letter to the American Physical Society (61 names); and
- l. Interviewees in the 2007 TV film “The Great Global Warming Swindle” (17 names).

After removing duplicates, there was a total of 472 names.²²

Three people were members of both data sets. The author of the study then excluded from both lists persons who had not published a minimum of 20 peer-reviewed papers in climate science. This arbitrary limitation removed 10% of people from list A, and 80% of the people from list B. Even after this elimination, 11% of the total were still in group B.

Note, too, that category B did not include:

- (1) The more than 650 scientists listed in the minority report of the U.S. Senate Environment and Public Works Committee published on December 11, 2008 titled “More Than 650 International Scientists Dissent Over Man-Made Global Warming Claims Scientists Continue to Debunk ‘Consensus;’”²³
- (2) The Oregon Petition which included 31,479 American scientists, including 9,029 PhDs, (after removal of various factitious names deceptively added);²⁴ and

²² William R. L. Anderegg, James W. Prall, Jacob Harold, and Stephen H. Schneider, Expert credibility in climate change (2010), <https://www.pnas.org/content/107/27/12107>.

²³ U.S. Senate Environment and Public Works Committee, “More Than 650 International Scientists Dissent over Man-Made Global Warming Claims Scientists Continue to Debunk ‘Consensus’ in 2008,” Minority Staff Report (Update of the 2007 Report: “Over 400 Prominent Scientists Disputed Man-Made Global Warming Claims in 2007”), December 11, 2008, https://web.archive.org/web/20130317191713/http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=83947f5d-d84a-4a84-ad5d-6e2d71db52d9.

²⁴ Global Warming Petition Project, accessed June 27, 2019, http://petitionproject.org/signers_by_last_name.php?run=all.

(3) The list of 500 scientists from the Heartland Institute in 2007.²⁵

Failure to include these sources, without explanation, substantially undermines the significance of this study.

This paper admits that, “Our dataset is not comprehensive of the climate community and therefore does not infer absolute numbers or proportions of all [those convinced by the evidence] versus all researchers [unconvinced by the evidence].” This qualification is totally ignored by NASA. The paper itself states it cannot be used, as NASA has done, to infer the proportion of all climate scientists.

In short, the paper does not support NASA’s 97% claim. Excluding from the survey those who have published fewer than 20 studies arbitrarily narrows the sample size. Many potential scientists for Group B were not included. Even so, Anderegg estimates 11% of scientists oppose AGW. Most scientists simply do not make such position statements (and as such were in neither list), and we cannot infer what those scientists believe by their lack of a public statement, as NASA has done.

4. The 2009 Doran Study

This study was based on a survey to 10,257 Earth Science faculty with two questions:

1. When compared with pre-1800s levels, do you think that mean global temperatures have generally risen, fallen, or remained relatively constant?

2. Do you think human activity is a significant contributing factor in changing mean global temperatures?²⁶

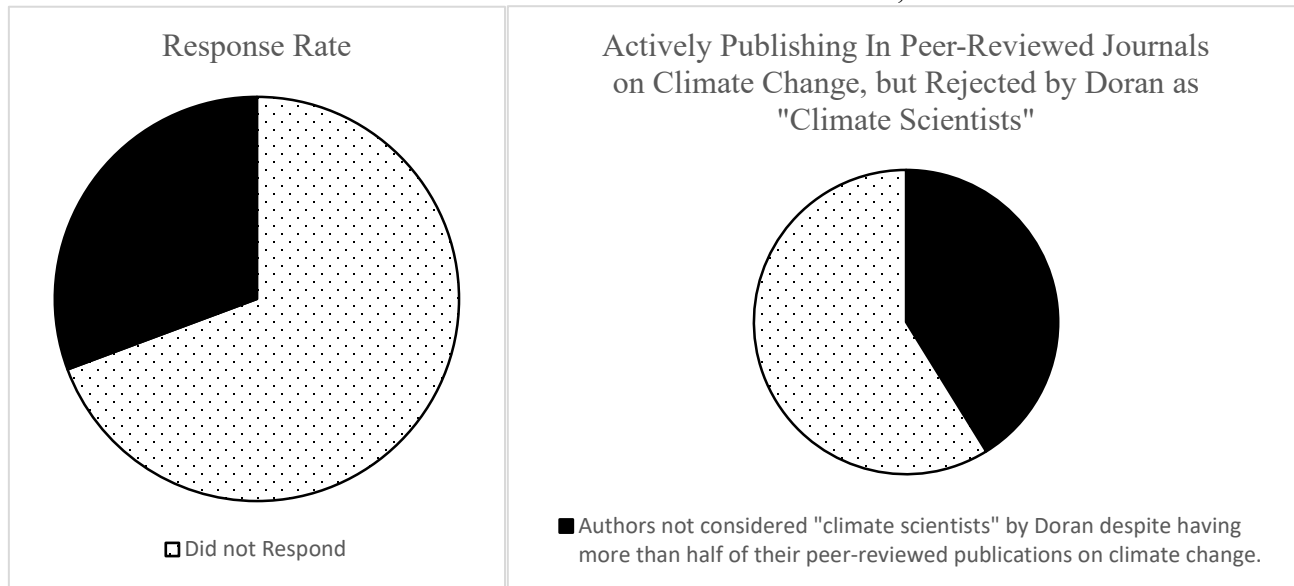
The results showed that 30.7% of the individuals who received the survey responded to it. Of the 3,146 respondents 18% stated that human activity was not a significant contributing factor in changing mean global temperatures. Of those 3,146 respondents, 5%, or about 157 individuals, were what the authors of the study called “climate scientists” (self-described, and having no other primary specialty).

The authors noted that 8.5% of the respondents indicated that more than 50% of their peer-reviewed publications in the last 5 years were on the subject of climate change, but even these individuals were not considered “climate scientists.” Excluded from the definition of “climate scientists” were people with expertise in areas such as oceanography, hydrology, paleontology, and meteorology, which can help provide expertise related to the climate and to the historical climate record.

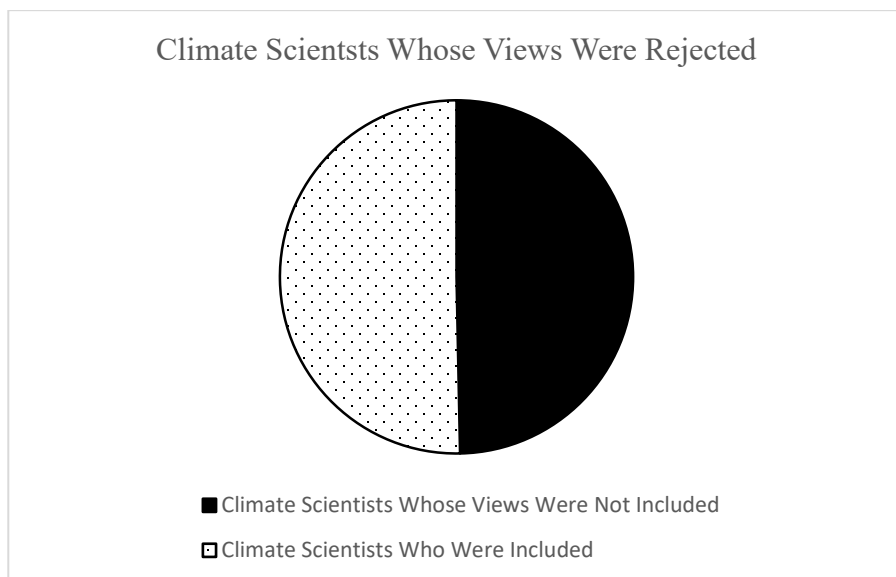
²⁵ Dennis Avery, “500 Scientists Whose Research Contradicts Man-Made Global Warming Scare,” Heartland Institute, September 14, 2007, <https://www.heartland.org/publications-resources/publications/500-scientists-whose-research-contradicts-man-made-global-warming-scares>.

²⁶ Peter T. Doran and Maggie Kendall Zimmerman, Examining the Scientific Consensus on Climate Change (2009), <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2009EO030002>.

The survey respondents were not allowed to select multiple categories of specialization, so it excluded scientists who also consider themselves “climate scientists,” in addition to other



The final figure did not even include all “climate scientists” (as described by the author) or those who were actively publishing, as those that did not also publish at least half their peer-reviewed papers on climate change were excluded. Of the scientists with more than half of their publications in peer reviewed journals on climate change, 41% were not considered “climate scientists” by Doran. The views of a well-respected climate scientist with papers on a variety of non-climate-change climate issues, as well as highly cited climate change papers, would be excluded. The final results of this survey were based on a total of just 79 individuals.



Out of a total of 10,257 scientific faculty members at major institutions, only 79 were counted in the final tally by the author. That is a mere 0.07% of the total number of scientific faculty to whom the survey was sent.

But even with these caveats, this survey does not support the statement by NASA. This survey only asked if human activity was a “significant contributing factor,” not if it was “extremely likely due to human activities,” the latter is the wording that NASA uses. The survey speaks of human activity merely as a significant factor of warming, while the NASA statement suggests that human activity is the primary cause. The NASA statement also concerns itself with the likelihood of such causation, which this survey did not ask about.

In addition, 69% of the scientists who received the survey did not respond to it. Therefore, no conclusion can be reached concerning the non-responding scientists’ beliefs concerning the causes of global warming. Perhaps those who do not believe in man-made global warming do not respond to surveys they consider to be biased against them. We do not know and cannot assume to know why they did not respond to the survey. Regardless, a survey which rejects the views of many climate scientists cannot be used to support NASA’s statement.

5. The 2004 Oreskes Study

In this study, Oreskes started with the abstracts of peer-reviewed articles published between 1993 and 2003 with a keyword in the Institute for Scientific Information’s Web of Science database. While the paper states she searched for “climate change,” in response to criticism, Oreskes issued a formal correction that she instead searched for the keyword “global climate change.”²⁷ She found 928 abstracts in the database. She examined each of these abstracts (not the text of the peer-reviewed paper), and categorized them into:

- (1) Explicit endorsement of the anthropogenic climate change position;
- (2) Evaluation of impacts;
- (3) Mitigation proposals;
- (4) Methods;
- (5) Paleoclimate analysis; and
- (6) Rejection of the anthropogenic climate change position.

According to Oreskes, 75% fell into the first three categories. She does not say how many fall into category 1 and explicitly endorse the anthropogenic climate change position. The study notes “authors evaluating impacts, developing methods, or studying paleoclimatic change might believe that current climate change is natural.”

Oreskes’s paper is subject to 3 qualifications: (1) only examined abstracts from 1993 through 2003, (2) doesn’t say how many of these endorsed the anthropogenic climate change position, and (3) acknowledges some scientists in categories 2-5 “might believe that current climate change is natural.” Due to these qualifications, this is a very poor study for NASA to rely upon for its statement.

²⁷ It is marked as corrected on the *Science* website: Naomi Oreskes, “The Scientific Consensus on Climate Change,” *Science*, Vol. 306, Issue 5702 (December 2004), p. 1686, <https://science.sciencemag.org/content/306/5702/1686>, The correction is at “Corrections and Clarifications,” *Science*, Vol. 307, Issue 5708 (January 2005), p. 355, <https://science.sciencemag.org/content/307/5708/355>.

Because the Oreskes study excluded abstracts that did not take a position, it is subject to many of the same problems in the Cook study. It says nothing about the vast majority of scientists who do not take a position on the issue.

Conclusion

Failing to account for scientists who do not have—or have not publicly stated—a position on global warming makes the statement that “Ninety-seven percent of climate scientists agree that climate-warming trends over the past century are extremely likely due to human activities,” inaccurate, unreliable, and biased.

Presenting such an inaccurate, unreliable, and biased statement is a violation of the Information Quality Act. NASA should stop distributing that statement by removing it from the NASA website. A correction, informing the public that this prior statement did not have a proper basis in fact and should not be relied upon, would also help relieve the problems caused by its prior distribution.

Sincerely,

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