



## Central Coast Climate Science Education

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### Misperception #3:

"There is no Scientific Consensus on Global Warming"

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One of the most common misperceptions held by the general public is that **climate scientists are evenly divided** about whether:

- a) The Earth has been warming over the last several decades and
- b) Human activities--partly deforestation but mostly burning of fossil fuels-- play a major role in this warming.

In fact, about 50% of the general public believe that this deep division exists. Actually, there is strong agreement among **climate scientists** that the answer to both these questions is '**yes**'. We describe two recent polls and a survey of professional scientific societies to document this.

Before doing this, let us agree that the fact of a strong consensus does not **automatically** mean that the climate scientists are correct. What it **does** mean, however, is that we ought to take very seriously what they are telling us, and understand **why** there is such a strong consensus. We also need to describe who **is**, and who **is not**, a '**climate scientist**'.

Climate science is a very broad and complex subject and involves atmospheric science, oceanography, glaciology, chemistry, meteorology, paleontology, branches of biology, computer science and many other disciplines.

The training for anyone **doing frontier published research** in any of these areas, **as they relate to the study of the Earth's climate** involves (with rare exceptions):

- i) Four years as an undergraduate with a degree in one of the above or other science-related areas.
- ii) Completion of a PhD in any of these areas in a University with a strong research program.
- iii) Further advanced training as a Post Doctoral Fellow, working under the supervision of an experienced research scientist and the launching of a research career. Hopefully, this results in joining a university staff, government lab, or private research institution.
- iv) Ongoing professional growth and development including interacting with one's colleagues through professional societies (like the American Geophysical Union, for example), participation at meetings and workshops on specialized topics, and, most importantly, conducting and publishing original research in peer-reviewed professional journals. (See my Essay on the Peer Review process in the Essays and Tutorials part of this website: <http://www.centralcoastclimatescience.org/essay-01.pdf>)

It is this group of individuals who have the necessary expertise to answer the two questions above authoritatively. My guess is that there are probably around 3000 such individuals worldwide who are currently doing such frontier research.

Let me acknowledge right off the bat that I myself do not belong to this group, but my posts on this website are based on reading many papers published by these research scientists and consulting with many of them for clarification of issues.

Among those who are **not** climate scientists are TV weather personalities who are able to read weather forecasts and charts with winning smiles and witty remarks and point out warm fronts and cold fronts and high and low pressure systems on a weather map. But this does not remotely qualify them to speak on the Earth's climate and how it may be changing.

With that introductory material out of the way, let's examine two polls that were conducted to gauge the degree of consensus on the two questions posed above.

This is followed by further evidence of consensus by a summary of the endorsements of the major relevant professional societies as well as the National Academies of Science of major countries of the world.

### Poll #1

This poll is by Drs. Peter T. Doran and Maggie Kendall Zimmerman.

These authors asked the following two questions of a large group of 'Earth Scientists' (which is a much broader group than the climate scientists I have described above):

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?"

### Results of Poll #1

The two authors report the following results:

"Results show that overall, 90% of participants answered "risen" to question 1 and 82% answered yes to question 2. In general, as the level of active research and specialization in climate science increases, so does agreement with the two primary questions... In our survey, the most specialized and knowledgeable respondents (with regard to climate change) are those who listed climate science as their area of expertise and who also have published more than 50% of their recent peer-reviewed papers on the subject of climate change (79 individuals in total). Of these specialists, 96.2% (76 of 79) answered "risen" to question 1 and 97.4% (75 of 77) answered yes to question 2."

The authors also note that :

"the survey included participants with well-documented dissenting opinions on global warming theory"

Here is the concluding paragraph from this paper:

"It seems that the debate on the authenticity of global warming and the role played by human activity is largely nonexistent among those who understand the nuances and scientific basis of long-term climate processes. The challenge, rather, appears to be how to effectively communicate this fact to

policy makers and to a public that continues to mistakenly perceive debate among [climate] scientists.

## Poll #2

This poll was by Fergus Brown, Dr. Roger Pielke Sr, & Dr. James Annan.

It has not been published. Normally, I do not make use of unpublished references, but in this case one of the three authors is one of the two or three best known 'skeptics' among climate scientists (Dr. Roger A. Pielke Sr.), and he participated in formulating the poll. In this instance, therefore, it seems fair to assume that the poll was not 'tilted' against the skeptics. The individuals who were invited to participate in this poll were those who had recently published papers in the more prominent climate science journals. There were 1807 scientists contacted but only 140 responded (not surprisingly--most active researchers don't want to be bothered with polls--like many of the rest of us.)

This poll is especially interesting since it is tied to the WG-1 portion of the 2007 IPCC report, which has come under criticism lately. (In a forthcoming Essay I will describe the structure and operation of the IPCC). WG-1 is 'working group I' whose task was to produce an assessment of the current state of scientific understanding of the climate.) However, the respondents may or may not have had anything to do with the report.

Respondents were asked to choose 1 out of the following choices which best described their own evaluation of the state of knowledge of the climate system. Respondents were allowed the option of checking 2 adjacent choices (e.g. 4 and 5, which was then scored as a 4.5)

Here are the 7 possible responses:

1. There is no warming; it is a fabrication based on inaccurate/inappropriate measurement. Human activity is not having any significant effect on Climate. The data on which such assumptions are made is so compromised as to be worthless. The physical science basis of AGW theory is founded on a false hypothesis.

2. Any recent warming is most likely natural. Human input of CO<sub>2</sub> has very little to do with it. Solar, naturally varying water vapor and similar variables can explain most or all of the climate changes. Projections based on Global Climate Models are unreliable because these are based on too many assumptions and unreliable datasets.

3. There are changes in the atmosphere, including added CO<sub>2</sub> from human activities, but significant climate effects are likely to be all within natural limits. The 'scares' are exaggerations with a political motive. The undue emphasis on CO<sub>2</sub> diverts attention away from other, important research on climate variability and change.

4. There is warming and the human addition of CO<sub>2</sub> causes some of it, but the science is too uncertain to be confident about current attributions of the precise role of CO<sub>2</sub> with respect to other climate forcings. The IPCC WG1 overestimates the role of CO<sub>2</sub> relative to other forcings, including a diverse variety of human climate forcings.

5. The scientific basis for human impacts on climate is well represented by the IPCC WG1 report. The lead scientists know what they are doing. We are warming the planet, with CO<sub>2</sub> as the main culprit. At least some of the forecast consequences of this change are based on robust evidence.

6. The IPCC WG1 is compromised by political intervention; I agree with those scientists who say that the IPCC WG1 is underestimating the problem. Action to reduce human emissions of CO<sub>2</sub> in

order to mitigate against serious consequences is more urgent than the report suggests. This should be done irrespective of other climate and environmental considerations.

7. The IPCC WG1 seriously understates the human influence on climate. I agree with those scientists who say that major mitigation responses are needed immediately to prevent catastrophic serious warming and other impacts projected to result from human emissions of CO2. We are seriously damaging the Earth's climate, and will continue to face devastating consequences for many years.

To put the seven responses in the context of the 2007 IPCC WG-1 report here are two key sentences from the "Summary for Policy Makers" portion of the IPCC WG-1 report.

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level..."

"Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations."

### Results of Poll #2

As noted above, some of the respondents checked two adjacent boxes which were then scored as half way between the two adjacent boxes. Here are results in percentages. Because the number of responses are small, round-off errors made the total percentages 99% instead of 100%.

answer	percentage
1	0
1.5	0
2	1
2.5	1
3	2
3.5	3
4	10
4.5	5
5	47
5.5	13
6	7
6.5	1
7	9

Here are extracts from the conclusions drawn by the authors. The full paper is available via the link below.

"No scientists were willing to admit to the statement that global warming is a fabrication and that human activity is not having any significant effect on climate [0%]. In total, 18% responded that the IPCC AR4 WG1 Report probably overstates the role of CO2, or exaggerates the risks implied by focusing on CO2-dominated Anthropogenic Global Warming (AGW), to a greater or lesser degree. A further 17% expressed the opinion that the Report probably underestimates or seriously underestimates the consequences of anthropogenic CO2-induced AGW and that the associated risks are more severe than is implied in the report. The remaining 65% expressed some degree of concurrence with the report's science basis, of which the largest group [47% of all respondents] selected option 5.

## Endorsements of Professional Societies and National Academies of Science.

The following link provides a compendium of statements from relevant professional scientific societies and National Academies of Science:

[http://www.post-carbon-living.com/TTHW/Documents/Climate\\_Change\\_Consensus.pdf](http://www.post-carbon-living.com/TTHW/Documents/Climate_Change_Consensus.pdf)

Here is the opening statement from that document:

"National and international science academies and scientific societies have assessed the current scientific opinion, in particular on recent global warming. These assessments have largely followed or endorsed the Intergovernmental Panel on Climate Change (IPCC) position of January 2001 that states:

An increasing body of observations gives a collective picture of a warming world and other changes in the climate system... There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.

Since 2007, no scientific body of national or international standing has maintained a dissenting opinion. A few North American organizations hold non-committal positions."

Finally, regarding the oft-repeated statement that 32,000 of the "world's leading scientists" reject human-caused global warming, here is a video. Enjoy it.

<http://www.youtube.com/watch?v=Py2XVILHUjQ>

### References

#### Poll #1:

"Examining the Scientific Consensus on Climate Change"

Doran, Peter. T., and Zimmerman, Maggie Kendall (2009)

*EOS*, Vol 90 Number 23, 20 Jan. 2009

The full paper is available in pdf format:

<http://www.centralcoastclimatescience.org/poll-consensus.pdf>

#### Poll #2:

"Is there agreement amongst climate scientists on the IPCC AR4 WG1?"

Brown, Fergus W.M., Pielke, Roger A. Sr. & Annan, James D.

(unpublished; used by permission of Dr. Annan).

The full paper is available in pdf format:

<http://www.centralcoastclimatescience.org/poll-annan.pdf>