



George Mason University
Center for Climate Change Communication

**American Meteorological Society Member Survey on Global Warming:
Preliminary Findings**

February 12th, 2012

Survey conducted under the auspices of
AMS Committee to Improve Climate Change Communication (CICCC)

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Cite as: Maibach E, Stenhouse N, Cobb S, Ban R, Bleistein A, et al. (2012)
American Meteorological Society Member Survey on Global Warming:
Preliminary Findings. Fairfax, VA: Center for Climate Change Communication.
Available for download at: <http://climate.gmu.edu>

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Foreword

In early 2011, the American Meteorological Society (AMS) Commission on the Weather and Climate Enterprise (CWCE) established the Committee to Improve Climate Change Communication (CICCC) to help facilitate communication among members of the weather and climate community so as to foster greater understanding about the spectrum of views on climate change through various forums and mechanisms.

To that end, CICCC collaborated with Dr. Ed Maibach at George Mason University (GMU) to assess AMS members' perspectives about climate change. Specifically, CICCC hoped to learn AMS member perspectives on a variety of issues pertaining to climate change including: their assessment of the evidence, their perception of conflict among our members, their views about AMS's role in public education, and their personal involvement in public education activities.

On December 29, 2011 the survey was distributed and we are able to share the preliminary results. This report has been vetted among the CICCC members and GMU. These results represent a sample obtained from the voting membership of AMS in order to better understand the varied perspectives that are contained within the AMS.

Ray Ban, Andrea Bleistein & Paul Croft
CICCC Co-Chairs

Background

AMS Members are a diverse group of professionals from throughout the weather and climate enterprise. Members must meet at least one of the following professional and/or educational requirements (although AMS holds a broad and inclusive interpretation of these requirements): hold a baccalaureate or higher degree from an accredited institution of higher learning in the atmospheric or related sciences; or hold a baccalaureate or higher degree from an accredited institution of higher learning in some other science or a related field and be currently engaged in a professional activity in which his or her knowledge is applied to the advancement or application of the atmospheric or related sciences; or have completed at least 20 semester hours of college level coursework in the atmospheric or related sciences and have at least three years of professional experience in the last five years.

Research Aim

The aim of the survey was to answer the following five research questions:

RQ1: Do AMS members feel there is unproductive conflict about climate change within AMS? If so, what do they see as the nature of that conflict? Do they feel able to talk about the issues?

RQ2: If members feel there is unproductive conflict within the membership, to what degree would they support efforts by AMS to better understand the nature of the conflict and take steps to mediate it?

RQ3: What is the range of views among AMS members regarding the existence of climate change, its causes (human v natural), and its implications (i.e., the degree to which it is seen as a serious problem, or not; the degree to which climate change can be limited)? Are members' views of the conflict (see RQ1 and 2) related to their views about climate change?

RQ4: To what degree do members feel AMS should play an active role in educating the public and other external audiences (e.g., policy makers) about climate change? How large a priority should this be?

RQ5: To what extent are AMS members themselves willing to play a role in educating the public and other external audiences? What, if anything, are they

currently doing in this capacity? What, if anything, additional would they like to do?

Methods

On December 29th, 2011, an email was sent to all 7,197 AMS voting Members (for whom AMS had email addresses as of that date), inviting them to participate in a web-based survey about climate change. A second and third invitation was emailed to non-respondents 7 and 14 days later, respectively. Of the 7,197 members on the initial list, 135 were ineligible because their email addresses were invalid. The valid initial denominator of the study, therefore, was 7,062. Of these 7,062 people, 1,862 completed at least some portion of the survey (as of 12:40pm on January 15th), yielding a minimum response rate of 26.4% (which assumes that all non-respondents were eligible to participate).

Summary of Key Findings

Context and limitations

The findings from this survey should be considered in the following context:

In this survey, global warming was defined as “the premise that the world’s average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world’s climate may change as a result.” The investigators received separate emails from six respondents who, after completing the survey, indicating that the reference period chosen to define global warming – i.e., the past 150 years – was not a good choice. All six suggested that a better reference period would have been the past 50 years, as this is the period for which human causation of global warming is most well established. The extent to which other respondents shared this perspective is unknown.

Perhaps more importantly, only about 1 out of 4 AMS Members responded to the survey. The extent to which the findings reported here represent the views of all AMS Members is therefore unknown. Additional analysis will be conducted to compare the demographics of respondents to non-respondents

(as a means of assessing the representativeness of the findings), and to code and analyze the written responses to open-ended questions in the survey.

A large majority of respondents to the survey (81%) agreed with the statement: “*the response options provided in this survey...allowed me to fairly represent my views.*” Small but important minorities of respondents disagreed (12%), or neither agreed nor disagreed (8%).

Demographics of the respondents

A diverse set of AMS members responded to the survey. Respondents tended to be PhD-educated (52%), middle-aged or older (59% aged 50 or older), males (85%), specializing in Meteorology/Atmospheric Science (66%), employed in government (29%), university (28%), or for-profit organization (23%), and focusing professionally on research (41%) or forecasting (19%). Most (56%) had published in peer-reviewed journals in the last 5 years. Of those who published, 23% had written more than half of their papers about climate change. Liberal respondents significantly outnumbered conservative respondents (48% vs. 21%).

Views about global warming

A very large majority of respondents (89%) indicated that global warming is happening; in contrast few indicated it isn't happening (4%), or that they “don't know” (7%). Respondents who indicated that global warming is happening were asked their views about its primary causes; a large majority indicated that human activity (59%), or human activity and natural causes in more or less equal amounts (11%), were the primary causes. Relatively few respondents indicated that the warning is caused primarily by natural causes (6%), although a substantial minority (23%) indicated they don't believe enough is yet known to determine the degree of human or natural causation.

A large majority of respondents who indicated the global warming is happening indicated that if nothing is done to address it, over the next 100 years it will be very harmful (38%) or somewhat harmful (38%) to people and society; a small minority of respondents indicated that the harms and benefits will be approximately equal (12%), or that the warning will be beneficial on the whole (2.4%). Among those respondents who indicated the warming would be harmful (including those who indicated that the harms and benefits

would occur in equal measures), only a small minority indicated that all (2%) or a large amount (20%) of the harms can be prevented through mitigation and adaptation measures; the more common responses were that a moderate amount (46%) or a small amount (22%) of the harm can be prevented.

All respondents were asked how worried they are about global warming: a large majority indicated they were very worried (30%) or somewhat worried (42%), while a minority indicated they were not very worried (20%) or not at all worried (8%).

Only 59% of respondents indicated that 81 to 100% of climate scientists think that human-caused global warming is happening, while 20% of respondents reported the number to be between 61 to 80%. Very small minorities replied 41 to 60% (9%), less than 40% (4%), and “ I don’t know enough to say” (9%).

Views about global warming as in issue in AMS

Approximately half of the respondents (53%) indicated that conflict exists within AMS about the issue of global warming. Of these respondents, about one third (35%) saw this conflict as being primarily productive, while about one quarter saw this conflict as being primarily unproductive (26%) or both productive and unproductive (27%). A large majority (79%) of respondents who felt the conflict was unproductive (or both productive and unproductive) indicated their support for AMS to take steps to better understand why these conflicts exist, and over half (59%) felt AMS should take steps to resolve the conflicts. Nearly half (46%) indicated that they personally would be willing to work with and through AMS to resolve conflicts about global warming among its members. Less than one third (29%) indicated they feel reluctance to bring up the issue of global warming at AMS meeting or other AMS forums.

Views about educating the public and policy makers about global warming

A large majority of respondents were supportive of AMS playing a role in educating the public (82%) and policy makers (85%) about global warming. A smaller majority (62%) indicated that they are personally interested in educating the public and policy makers about global warming. Of those who said they are (or might be) personally interested in helping to educate the public or policy makers, the average (i.e., the median) respondent had spent 10 hours contributing to public and policy maker educational activities in the

past year. Almost half (49%) of these respondents indicated that they would like to spend more time on such educational activities in the future.

Detailed Findings

Note: Percentages greater than 1% have been rounded to the nearest whole number. Percentages less than 1% have been rounded to the nearest tenth of a percent. Some totals may add to more or less than 100% due to rounding.

1. In this survey, the term “global warming” refers to the premise that the world’s average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world’s climate may change as a result.

Regardless of the cause, do you think that global warming is happening?

Yes	89%
No	4%
Don't Know	7%

n = 1815

2a. How sure are you that global warming is happening?

[Asked if answer to Question 1 is “Yes”]

Extremely sure	46%
Very sure	37%
Somewhat sure	16%
Not at all sure	1%

n = 1607

2b. How sure are you that global warming is not happening?

[Asked if answer to Question 1 is "No"]

Extremely sure	12%
Very sure	37%
Somewhat sure	44%
Not at all sure	7%

n = 73

Composite of Responses to Questions 1 and 2: Regardless of the cause, do you think that global warming is happening? How sure are you?

Yes – Extremely sure	41%
Yes – Very sure	33%
Yes – Somewhat sure	14%
Yes – Not at all sure	0.8%
Don't know	7%
No – Not at all sure	0.3%
No – Somewhat sure	2%
No – Very sure	1%
No – Extremely sure	0.5%

n = 1813

3. Do you think that the global warming that has occurred over the past 150 years has been caused...

[Asked if answer to Question 1 is "Yes"]

Mostly by human activity	59%
More-or-less equally by human activity and natural events	11%
Mostly by natural events	6%
I do not believe we (scientists) know enough yet to determine the degree of human or natural causation, even in the general terms stated in the categories above	23%
I don't know	1%

n = 1605

4. Over the next 100 years, how harmful or beneficial do you think global warming will be to people and society, if nothing is done to address it?

[Asked if answer to Question 1 is "Yes"]

Very harmful	38%
Somewhat harmful	38%
The harms and benefits will be more or less equal	12%
Somewhat beneficial	2%
Very beneficial	0.4%
Don't know	10%

n = 1603

5. How much of the harm to people and society that may be caused by global warming over the next 100 years can be prevented through mitigation measures (i.e., actions intended to decrease radiative forcing) and adaption measures (i.e., actions intended to reduce vulnerability)?

[Asked if answer to Question 4 is “Very harmful”, “Somewhat harmful” or “The harms and benefits will be more or less equal”]

Almost all	2%
A large amount	20%
A moderate amount	46%
A small amount	22%
Almost none	5%
Don't know	6%

n = 1404

6. How worried are you about global warming?

[Asked if answer to Question 1 is “Yes” or “Don't know”]

Very worried	30%
Somewhat worried	42%
Not very worried	20%
Not at all worried	8%

n = 1734

7. To the best of your knowledge, what proportion of climate scientists think that human-caused global warming is happening?

81 to 100%	59%
61 to 80%	20%
41 to 60%	9%
21 to 40%	3%
0 to 20%	1%
I don't know enough to say	9%

n = 1808

8. Do you agree or disagree with the following statement: There is conflict among AMS members on the issue of global warming.

Strongly agree	18%
Somewhat agree	35%
Neither agree nor disagree	15%
Somewhat disagree	18%
Strongly disagree	15%

n = 1797

9. On the whole, would you say this conflict about global warming among AMS members is:

[Asked if answer to question 8 is “Strongly agree” or “Somewhat agree”]

Highly productive	10%
Somewhat productive	25%
Neither productive nor unproductive	11%
Both productive and unproductive	27%
Somewhat unproductive	17%
Highly unproductive	9%

n = 945

10a. Briefly, why do you think the conflict among AMS members over global warming is productive?

[Asked if answer to question 9 is “Highly productive”, “Somewhat productive” or “Both productive and unproductive”]

Full text answers were provided to this question; this data has not yet been coded and analyzed.

10b. Briefly, why do you think the conflict among AMS members over global warming is unproductive?

[Asked if answer to Question 9 is “Highly unproductive”, “Somewhat unproductive” or “Both productive and unproductive”]

Full text answers were provided to this question; this data has not yet been coded and analyzed.

11. I am reluctant to bring up the topic of global warming in AMS meetings or other AMS forums.

[Asked if answer to Question 8 is “Strongly agree” or “Somewhat agree”]

Strongly agree	9%
Somewhat agree	20%
Neither agree nor disagree	27%
Somewhat disagree	17%
Strongly disagree	27%

n = 939

12. Why are you reluctant to bring up the topic of global warming?

[Asked if answer to Question 11 is “Strongly agree” or “Somewhat agree”]

Full text answers were provided to this question; this data has not yet been coded and analyzed.

13. I think that AMS should take steps to better understand why there are conflicts about global warming among their members.

[Asked if answer to Question 9 is “Highly unproductive”, “Somewhat unproductive” or “Both productive and unproductive”]

Strongly agree	38%
Somewhat agree	41%
Neither agree nor disagree	13%
Somewhat disagree	5%
Strongly disagree	3%

n = 501

14. I think that AMS should take steps to resolve conflicts about global warming among their members.

[Asked if answer to Question 9 is “Highly unproductive”, “Somewhat unproductive” or “Both productive and unproductive”]

Strongly agree	23%
Somewhat agree	36%
Neither agree nor disagree	21%
Somewhat disagree	13%
Strongly disagree	7%

n = 498

15. I would personally be willing to work with and through AMS to resolve conflicts about global warming among its members.

[Asked if answer to Question 9 is “Highly unproductive”, “Somewhat unproductive” or “Both productive and unproductive”]

Strongly agree	18%
Somewhat agree	28%
Neither agree nor disagree	29%
Somewhat disagree	14%
Strongly disagree	10%

n = 499

16. What message, if any, would you like to convey to AMS leadership about global warming-related conflicts within AMS?

Full text answers were provided to this question; this data has not yet been coded and analyzed.

17. I think that AMS should help to educate the public about global warming.

Strongly agree	58%
Somewhat agree	24%
Neither agree nor disagree	7%
Somewhat disagree	4%
Strongly disagree	6%

n = 1790

18. I think that AMS should help to educate policy makers about global warming.

Strongly agree	64%
Somewhat disagree	21%
Neither agree nor disagree	6%
Somewhat agree	3%
Strongly disagree	7%

n = 1777

19. I am personally interested in helping to educate the public or policy makers about global warming.

Strongly agree	30%
Somewhat agree	32%
Neither agree nor disagree	21%
Somewhat disagree	9%
Strongly disagree	8%

n = 1781

20. Over the past 12 months, approximately how many hours have you personally spent educating (or making preparations to educate) the public or policy makers about global warming?

[Asked if answer to Question 19 is “Strongly agree”, “Somewhat agree” or “Neither agree nor disagree”. Maximum possible response was 999.]

Mean	55
Median	10
SD	136
Range	0 to 999

n = 1405

21. In the future, would you like to increase, decrease or keep your global warming educational activities at their current level?

[Asked if answer to Question 19 is “Strongly agree”, “Somewhat agree” or “Neither agree nor disagree”]

Increase	49%
Decrease	2%
About the same	49%

n = 1454

22. Which category best describes your area of expertise?

Meteorology/Atmospheric Science	66%
Climate Science	13%
Oceanography/Marine Sciences	5%
Atmospheric chemistry	2%
Hydrology	2%
Engineering	2%
Physical Geography	1%
Space Weather	1%
Computer Science/Technology	1%
Business	1%
Geophysical Sciences	0.9%
Public Administration/Public Policy	0.5%
Social Science	0.4%
Human Geography	0.2%
Ecology/Biogeochemistry	0.2%
Geochemistry	0.1%
Glaciology	0.1%
Economics	0.1%
Other	2%

n = 1796

23. What is your highest degree attained?

PhD (or other doctoral degree)	52%
MS or MA	28%
BS or BA	19%
AS or AA	0.6%
High school diploma or GED	0.2%
No degree	0.1%

n = 1793

24. Which of the following best describes how you spent the majority of the past 12 months?

Employed in a college or university	28%
Employed in a K-12 school	0.4%
Employed in government, as a public employee	23%
Employed in government, as a private contractor	6%
Employed in some other for-profit organization	23%
Employed in some other non-profit organization	7%
Student	0.8%
Retired	11%
Unemployed	0.8%

n = 1789

25. Which of the following best describes your primary professional focus over the past 12 months?

Research	41%
Education	11%
Forecasting (including for broadcast)	19%
Engineering	5%
Business activities (business development, sales, service, etc.)	5%
Policy	2%
Administration/management	8%
Other	9%

n = 1788

26. Have you published in peer-reviewed journals in the past five years?

Yes	56%
No	44%

n = 1792

27. What percentage of your papers published in peer-reviewed journals in the last 5 years have been on the subject of climate change?

[Asked if answer to question 26 is "Yes"]

50% or more	23%
Less than 50%	56%
Not Applicable	21%

n = 1006

28. What is your gender?

Male	85%
Female	15%

n = 1785

29. What is your age?

18 to 29	5%
30 to 39	16%
40 to 49	20%
50 to 59	29%
60 to 69	21%
70+	9%

n = 1782

30. In what region do you currently live?

[Note: Due to an oversight, the "Outside the U.S." option was added after 430 participants had already completed the survey.]

Northeast (CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT, WV)	24%
Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA)	19%
Midwest (IA, IL, IN, MI, MN, MO, OH, WI)	10%
Great Plains (KS, MT, OK, NE, ND, SD, TX, WY)	9%
Southwest (AZ, CA, CO, NM, NV, UT)	19%
Northwest (WA, OR, ID)	5%
Alaska/Hawaii	1%
Outside the U.S.	12%

n = 1763

31. In general, do you think of yourself as:

Very conservative	5%
Somewhat conservative	16%
Moderate	31%
Somewhat liberal	34%
Very liberal	14%

n = 1763

32. Please evaluate this survey by indicating your agreement or disagreement with the following statement: *The response options provided in this survey (i.e., the answer options that you choose from in response to each question) allowed me to fairly represent my views.*

Strongly agree	30%
Somewhat agree	51%
Neither agree nor disagree	8%
Somewhat disagree	10%
Strongly disagree	2%

n = 1791