



Belief in Global Warming Among Americans Gradually Increases Following the Winter of 2015

A report from the National Surveys on Energy and Environment

Introduction

In the wake of a memorable winter season in the United States that included both record cold and snow in the Northeast and historic warmth and drought in the West, American views regarding the existence of global warming have rebounded to the seven-year NSEE average, with 63% of Americans believing there is evidence of climate change. However, there are notable differences among Americans who think global warming is occurring and those who do not in terms of their perceptions of the weather that they experienced during the winter of 2015. In essence views on the existence of global warming appear related to individuals' evaluations of the weather their area experienced last winter, with those expressing doubt in global warming more likely than their counterparts to identify the last winter season as colder than average. These are among the key findings of the latest version of the National Surveys on Energy and Environment (NSEE).

Key Findings

1. Just under two out of three Americans (63%) think that there is solid evidence of global warming, a mark slightly higher than what was measured in the fall of 2014 (60%), eight points higher than in the spring of 2014, and identical to the average of 63% in all NSEE surveys since 2008.
2. Solid majorities of Democrats (76%) and Independents (60%) believe that there is evidence of global warming. Meanwhile, Republicans remain highly divided on the question, with 45% indicating there is solid evidence of global warming compared with 42% who do not think such evidence exists. These findings are largely unchanged since the fall of 2014.
3. Americans' views on global warming appear to be affected by their experiences with the weather. 18% of those who do not think there is evidence of global warming report that last winter was warmer than normal in their area, while 38% of those who think there is evidence of global warming report warmer temperatures.
4. A growing proportion of Americans who think global warming is occurring attribute their position to the effects of severe droughts and extreme weather in areas of the United States.
5. Those who do not believe global warming is happening are increasingly citing personal observation of weather as the primary factor for their position on this matter. The spring survey marks the highest percentage (45%) of weather-observation reasoning among those expressing doubt in global warming since the NSEE began in 2008.

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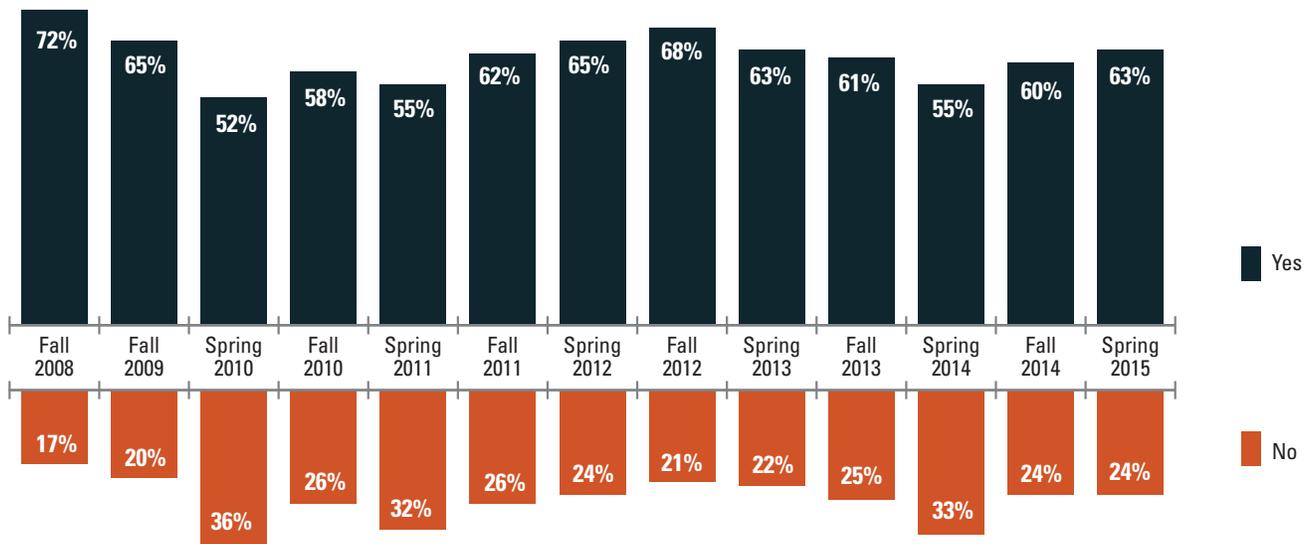


American Views on the Existence of Global Warming

The winter of 2015 was a remarkable one in the United States for the striking extremes that it brought by way of temperatures and precipitation. For example, while New York State was experiencing its coldest February since 1934 and the second coldest on record, California was experiencing its warmest February since records began to be kept in 1894.¹ As cities in the Northeast like Boston struggled through historic snowfalls and record cold snaps, much of the western United States experienced the intensification of a deep drought and well-above average temperatures. With such dramatic differences experienced by Americans, the NSEE went in the field as winter ended in its regular attempt to assess where Americans stand on the issue of global warming.

Throughout its history, the NSEE has asked Americans if they think there is solid evidence that global warming is occurring. In the spring of 2015 slightly fewer than two out of three Americans (63%) report that they think there is solid evidence that temperatures on Earth have risen over the past four decades. An additional 24% report they don't think such evidence exists and 13% are unsure about the matter. As can be seen in *Figure 1* below, these findings are fairly consistent with the Fall 2014 results. They also match the seven-year NSEE average (63% believe there is evidence of global warming; 24% do not).

Figure 1
American views on the existence of evidence of global warming
2008-2015



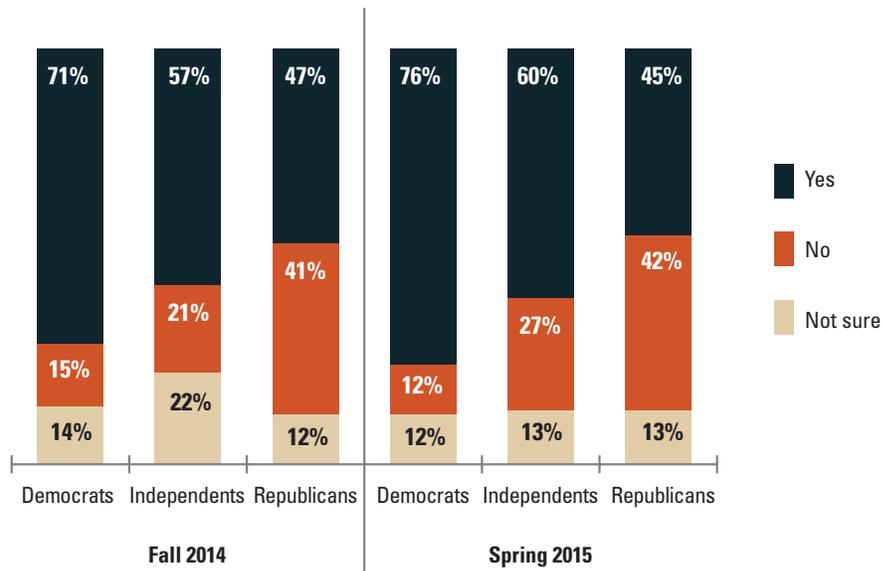
Note: "Not sure" responses not shown.

Question: "From what you've read and heard is there solid evidence that the average temperature on Earth has been getting warmer over the past four decades?"



Partisan affiliation remains one of the most potent predictors of an American’s views on global warming with strong majorities of Democrats (76%) and Independents (60%) indicating that there is evidence of global warming. Republicans are almost evenly split on the matter with 45% stating that there is evidence of global warming and 42% reporting that no such evidence exists. The results reported in *Figure 2* demonstrate the partisan divide on views on the existence of global warming and the limited change over the course of the past winter among Americans of various partisan affiliations.

Figure 2
American views on the existence of evidence of global warming, by political party affiliation

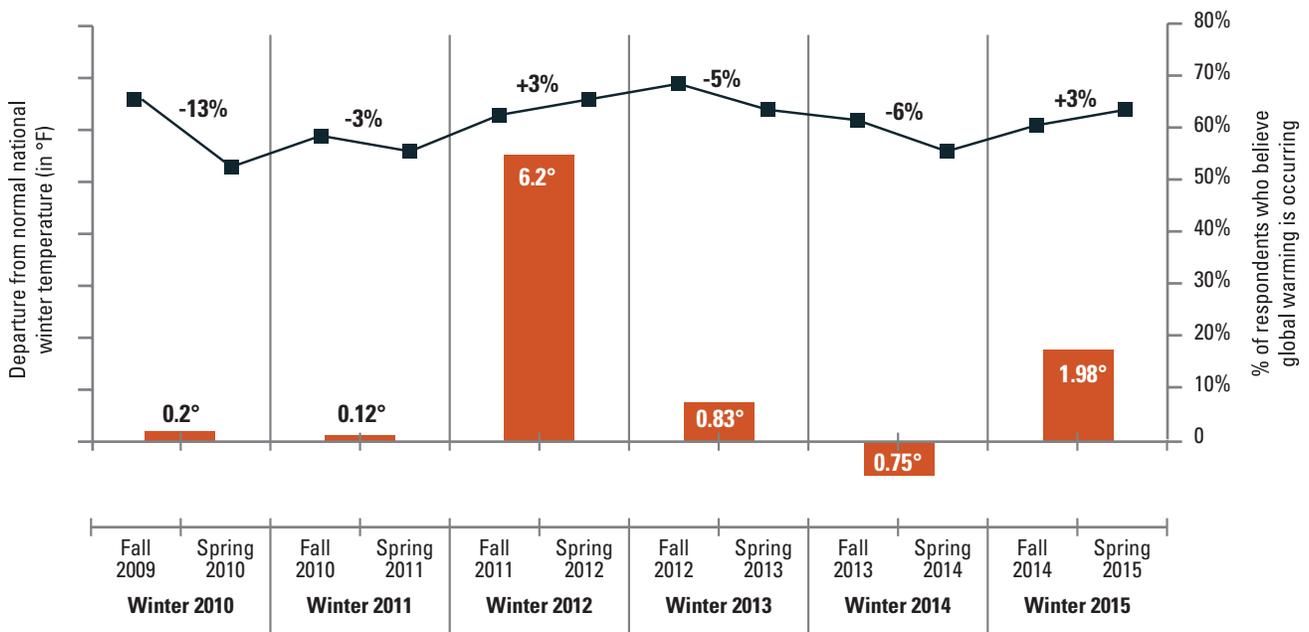


Question: “From what you’ve read and heard is there solid evidence that the average temperature on Earth has been getting warmer over the past four decades?”

The Role of Weather and American Views on Global Warming

Over recent years a number of studies have found evidence of the role of weather on American attitudes towards global warming. These studies have shown that an individual’s acceptance of global warming can be moderately affected by their experiences with weather.² The most recent round of the NSEE provides further evidence of the impact that weather can have on perceptions of global warming. First, the results point to a general relationship between winter temperatures and overall levels of acceptance of global warming in the United States. Usually, the NSEE results show belief in global warming falling over the cold winter months. In only two of the six years of the NSEE (2012 and 2015) did a greater percentage of Americans accept evidence of global warming in the spring survey than they had in the fall (see *Figure 3*). Notably, in both of those years national winter temperatures were substantially above average, including the winter of 2015 when national temperatures averaged almost two degrees Fahrenheit above average and acceptance of global warming climbed by 3% between the fall and spring versions of the NSEE.

Figure 3
The relationship between winter temperatures in the United States and changes in public acceptance of global warming between fall and spring surveys

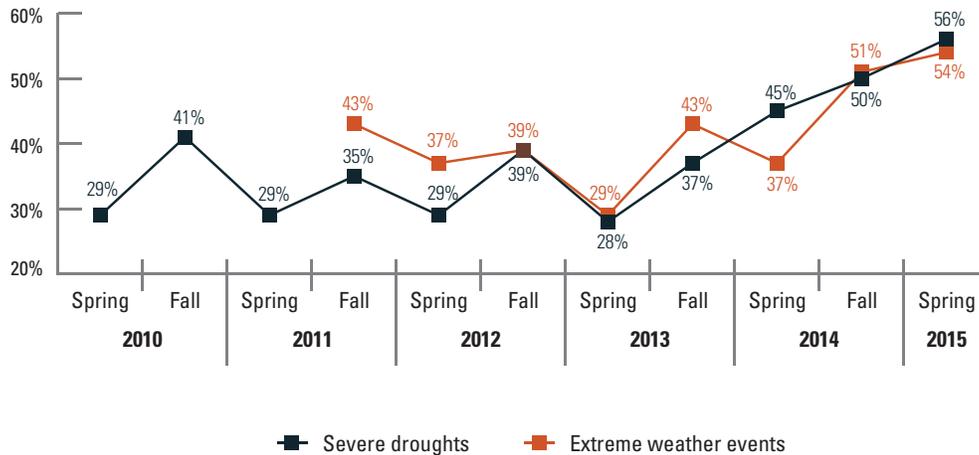


Source (winter temperature data): <http://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/>. See Note 3.



In addition to the broader patterns observed between national temperatures and acceptance of global warming, Americans are increasingly pointing to weather-related events such as severe droughts and extreme weather as key reasons why they believe global warming is occurring. Among Americans who think that global warming is occurring, a growing percentage state that severe droughts across areas of the United States and extreme weather events such as major storms and floods have had a very large effect on their view that the Earth is getting warmer. In terms of the effect of severe droughts, a record 56% of those who think global warming is occurring state that these conditions have a large effect on their position on the matter. This number is 6% higher than in the fall of 2014 and twice the level reported in the spring of 2013 (28%). As for the effects of extreme weather on Americans' acceptance of global warming, a record 54% of respondents who think temperatures on Earth are rising state that extreme weather has a very large effect on their belief (see Figure 4).

Figure 4
Percentage of Americans who indicate severe droughts and extreme weather have a "very large" effect on their view that global warming is occurring, among Americans who believe global warming is happening



Note: The question about severe droughts was also asked in fall 2008, and was cited by 47% of respondents as having a very large effect on their view that global warming is occurring.

Note: Fall 2011 was the first time extreme weather events were included in this question.

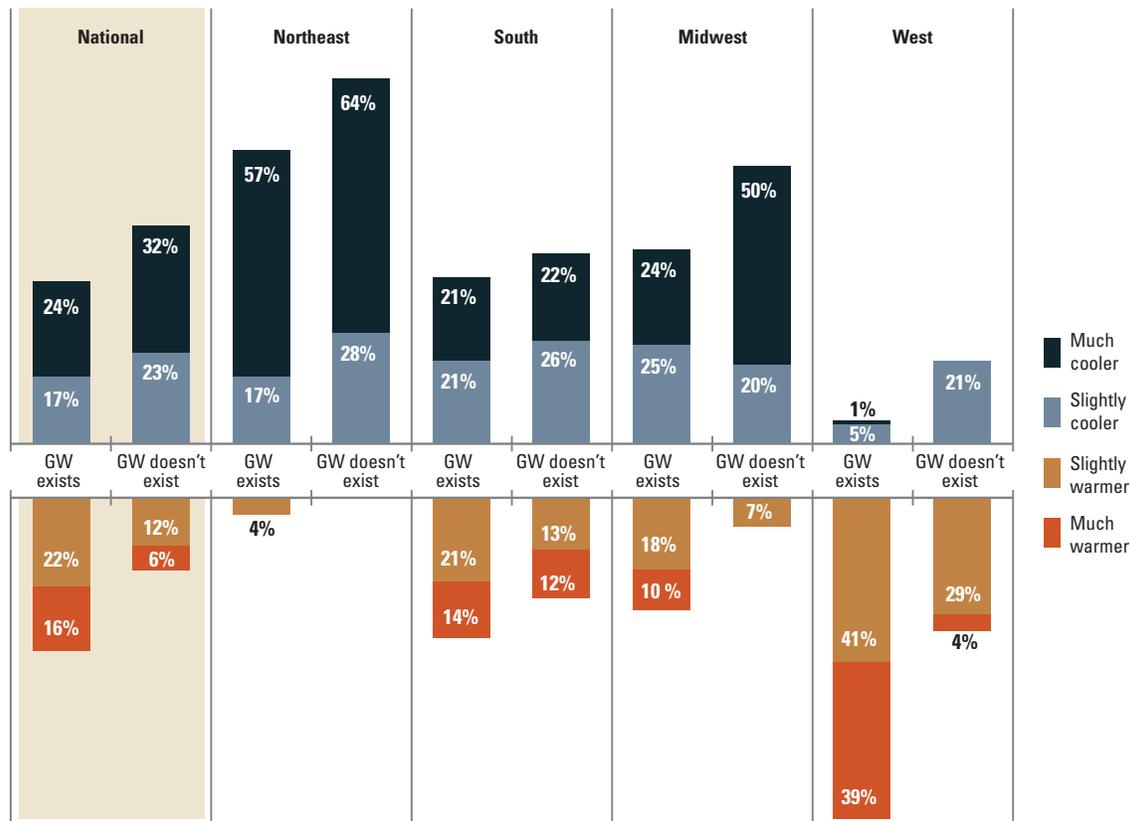
Question: "Next I would like to read you a list of factors that may or may not have had an effect on your view that the Earth is getting warmer. For each factor that I mention please indicate if it has had a very large, somewhat large, not too large, or no effect on your view that the Earth is getting warmer."

The Relationship between Views on Global Warming and Perceptions of Weather

While there is growing evidence that weather may affect an individual’s views on global warming, there is also some evidence that one’s views on global warming may affect the way they view the weather that they experience. A number of recent studies have found that an American’s views on the existence of global warming affect their evaluations of weather in their area.⁴ The latest round of the NSEE includes findings that further support the existence of this relationship. In particular, when asked to evaluate the temperatures in their area over the winter of 2015, Americans who express doubt in global warming were less likely than those who think global warming is happening to say that their weather last winter was warmer than normal. As can be seen in the “National” category of *Figure 5*, only 18% of those who do not believe global warming is happening say that their winter weather was warmer than normal, compared to 38% of Americans who think there is evidence of global warming.

While some of this variation in evaluations may be the product of actual weather differences experienced by the respondents (e.g. Americans who express doubt in global warming disproportionately living in places that were actually colder last winter), a control for region, and thus generally for weather differences, demonstrates that differences persist across areas of the nation. These differences are most notable in the western United States, where 80% of individuals who think global warming is happening indicate that the winter was warmer than normal, compared to only 33% of those who doubt the existence of global warming.

Figure 5
The relationship between individual views on the existence of global warming and perceptions of winter 2015 temperatures, nationally and by region of the United States



Note “About the same” and “Not sure” responses not shown.

Question: “In general how would you describe the overall weather in your area this past winter? Would you say it was a lot warmer than usual, slightly warmer than usual, slightly cooler than usual, a lot cooler than usual, or about the same as usual?”

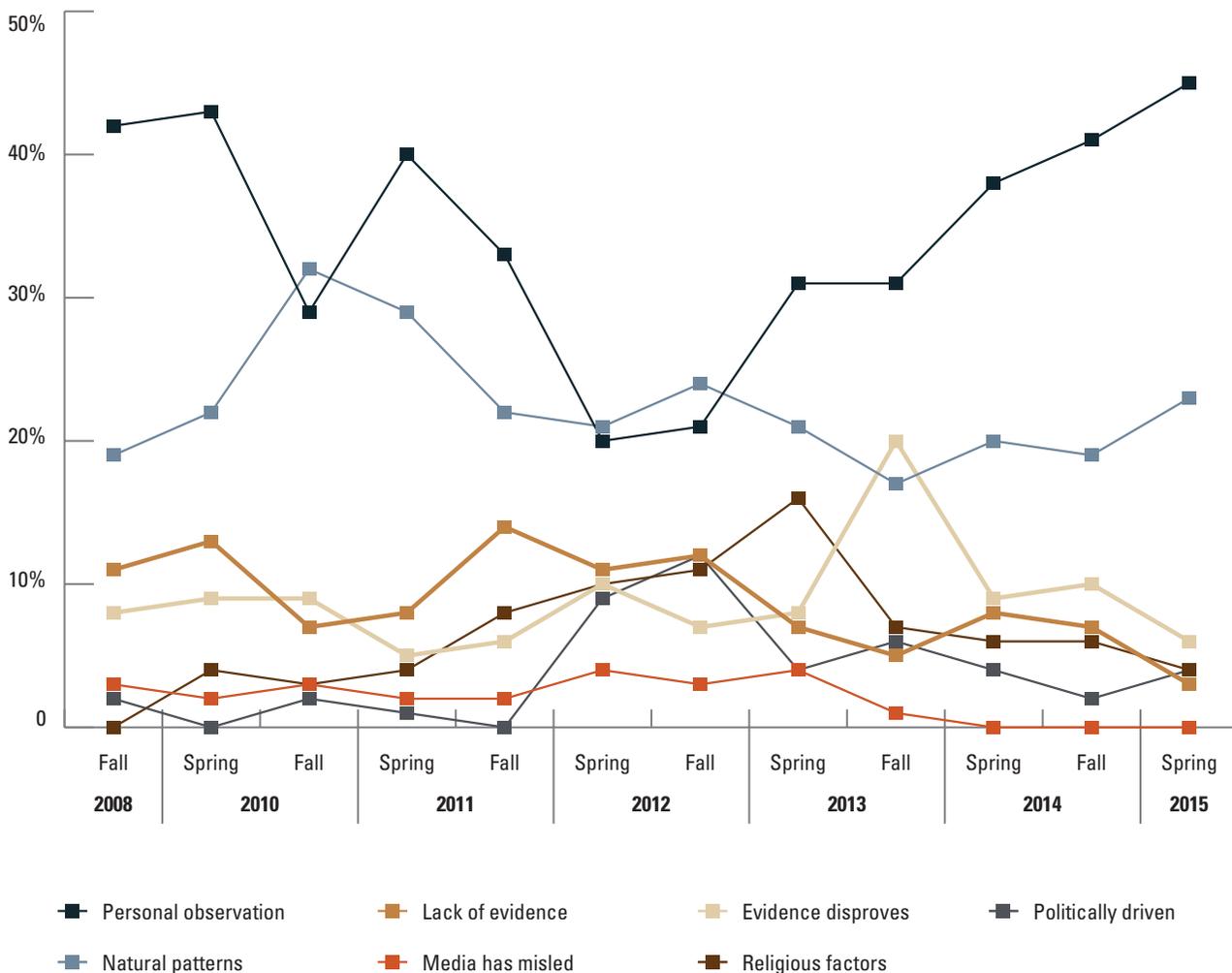
Responses grouped by region of the country and in response to question: “From what you’ve read and heard is there solid evidence that the average temperature on Earth has been getting warmer over the past four decades?”



Those Doubtful of Global Warming Increasingly Cite Personal Observations of Weather for their Views

The results of the Spring 2015 NSEE indicate that the role of individual observations of weather has increased as a primary factor for the position of the nearly one in four Americans who think global warming is not happening. In the latest version of the survey, 45% of those who do not believe global warming is happening state that the primary reason they hold that view is because of personal experiences with the weather. This is the highest percentage who have provided this reason since the NSEE began in 2008, and over twice as high as the percentage identifying this factor during the spring of 2012 (see Figure 6). During the most recent fielding, respondents regularly cited harsh winter weather as the major cause of their beliefs. For example, a middle-aged woman in Minnesota stated that her primary reason for her position that global warming is not happening is that there have been “colder horrible winters” and “records broken.” Similarly, a young man in Michigan said he is skeptical because “we have had record bad winters,” and an elderly man from Massachusetts stated his position for doubting the existence of global warming is “because of the cold winter and so much snow.”

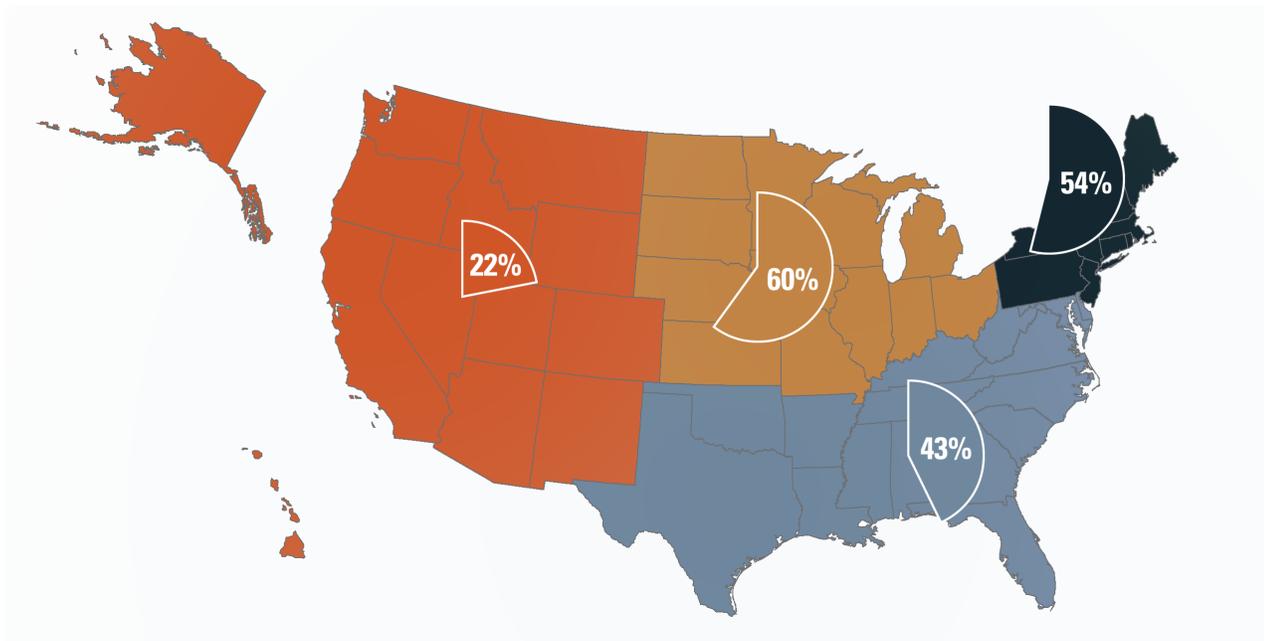
Figure 6
Primary reason for view that temperatures on Earth are not increasing, among Americans who do not believe global warming is happening



Question: “What is the primary factor that makes you believe that temperatures on Earth are not increasing?” (OPEN ENDED – CODED INTO CATEGORIES)

Given the highly varied weather across the United States during the winter of 2015, it may not be surprising that the primary factor behind global warming skepticism differs substantially across regions of the nation. As can be seen in *Figure 7*, among individuals who indicate they don't believe global warming is happening, those in the Midwest and Northeast are most likely to cite personal observations of weather as the primary factor for their view that global warming is not happening, while individuals living in western states are least likely to identify personal observations of weather as the main reason for their doubt in the existence of global warming.

Figure 7
Percentage of respondents who cite personal weather observations as the primary factor for expressing doubt in global warming, by region of the United States, among Americans who do not believe global warming is happening



Question: "What is the primary factor that makes you believe that temperatures on Earth are not increasing?" (OPEN ENDED – CODED INTO CATEGORIES)



Conclusion

The latest iteration of the National Surveys on Energy and Environment indicates that in the wake of the winter of 2015 public acceptance of global warming has risen by eight percentage points from one year ago. Almost two out of three Americans believe that there is evidence of global warming, a mark that is near the seven-year average as measured by the NSEE. The survey findings also indicate that Americans increasingly associate weather conditions and phenomena with their views on global warming. In addition, the NSEE findings provide preliminary evidence that individual views on global warming may affect one's evaluation of the weather they experience.

Methods

This report contains the results of a telephone survey of 751 adult (age 18 or older) residents of the United States between April 8 and April 30, 2015. Respondents were interviewed in English on both landlines (334) and cell phones (417) by the staff of the Muhlenberg College Institute of Public Opinion (MCIPO) in Allentown, Pennsylvania on the Institute's Computer Aided Telephone Interviewing (CATI) system. Of the 417 cell phone respondents, 293 had no landlines in their household. Both the landline and cell phone samples were provided by the Marketing Systems Group (MSG), Horsham, Pennsylvania. Both landlines and cell phones were chosen randomly from sampling frames of United States landline and cell numbers provided by MSG.

With a randomly selected sample of 751 respondents the margin of error for the survey is +/- 3.6% at a 95% level of confidence. Margins of error for questions with smaller sample sizes will be larger. In addition to sampling error, one should consider that question wording and other fielding issues can introduce error or bias into survey results. The sample data has been weighted by age, race, educational attainment, income, and gender to reflect 2013 population parameters for these factors provided by the United States Census Bureau. The calculation of sampling error takes into account design effects due to the weighting identified above. In order to reach a representative sample of adult Americans, both landlines and cell phones are called up to 10 times. The response rate for this survey as calculated using the American Association of Public Opinion Research (AAPOR) RR3 formula is 11%. Due to rounding, the totals provided in tables may not equal 100. The full instrument will be available upon release of subsequent reports in summer 2015. The instrument was designed by Christopher Borick of Muhlenberg College, Barry Rabe of the University of Michigan, and Erick Lachapelle of the University of Montreal. For more detailed information on the methods employed please contact the MCIPO at 484-664-3444 or email Dr. Borick at cborick@muhlenberg.edu.

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Notes

1. National Oceanic and Atmospheric Administration-National Centers for Environmental Information. (2015). *Climatological rankings*. Retrieved from <http://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/>. To reproduce these numbers, select the following options: 1-Month Period, Average Temperature (Parameter), New York (and, turn, California), and February 2015.
2. Egan, P. J., & Mullin, M. (2012). Turning personal experience into political attitudes: The effect of local weather on Americans' perceptions about global warming. *The Journal of Politics*, 74(3), 796-809. <http://dx.doi.org/10.1017/S0022381612000448>; Borick, C. P., & Rabe, B. G. (2014). Weather or not? Examining the impact of meteorological conditions on public opinion regarding global warming. *Weather, Climate, and Society*, 6(3), 413-424. <http://dx.doi.org/10.1175/WCAS-D-13-00042.1>
3. To reproduce winter temperature data shown in Figure 3, select the following options: 3-Month Period, Average Temperature (Parameter), Contiguous U.S., and March for each of the years between 2010 and 2015.
4. Howe, P. D., & Leiserowitz, A. (2013). Who remembers a hot summer or a cold winter? The asymmetric effect of beliefs about global warming on perceptions of local climate conditions in the U.S. *Global Environmental Change*, 23(6), 1488-1500. <http://dx.doi.org/10.1016/j.gloenvcha.2013.09.014>; Borick, C., Lachapelle, E., & Rabe, B. (2015, April). *Seasons gone by: An Examination of individual perceptions of past weather and their views on global warming*. Paper presented at the meeting of the Midwest Political Science Association, Chicago, IL. Retrieved from <http://closup.umich.edu/working-papers/37/seasons-gone-by-an-examination-of-individual-perceptions-of-past-weather-and-their-views-on-global-warming/>



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