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*Sea ice packs Woods Hole harbor, surrounding the R/V Knorr in port at Woods Hole Oceanographic Institution. Photo by Holly V. Moeller, 19 February 2015.*

## **Winter in the Anthropocene: Why snowstorms don't disprove climate change**

**Holly Moeller**

On Sunday afternoon, I sat at my desk working on a grant proposal while yet another snowstorm coated the trees outside my window with a fine layer of white. Late that evening, Boston's weather commentators celebrated a dubious feat when the city [broke the annual snowfall record](#). So far this winter, 108.6 inches of snow have fallen on Logan International Airport, beating the 1995-1996 winter's total by one inch.

It's been a tough winter for New England and its citizen snow shovelers. According to some estimates, the state of Massachusetts alone [lost about \\$1 billion](#) in wages and revenue as storms shut down transportation and businesses. Airlines flying in and out of the region cancelled hundreds of flights, stranding thousands of passengers. And the

New England Patriots had to [wait out a blizzard](#) before they could enjoy their Super Bowl victory parade.

Meanwhile, having just moved to Cape Cod, Massachusetts, in January, I was building up a back and shoulders that had grown tan and lazy after four years of easy living in California, while cringing at the political commentators who were using *my* snowdrifts to deny the existence of climate change.

For example, in late February, Senator James Inhofe (R-Oklahoma) [brought a snowball to the Senate floor](#) as tangible evidence of the “unseasonable” cold then afflicting Washington, D.C., and proof that the planet is not warming.

Inhofe seemed to feel that his handful of snow outweighed years of accumulated scientific evidence that have led the [scientific community to a clear consensus](#): human activity is changing our climate.

The senator’s logic was roundly mocked. For example, commentator [Alexandra Petri’s takedown](#) used a number of humorous parallels to highlight its absurdity. “My umbrella is dry right now. It has never rained,” she writes. “Here is a person who lives in America. No one lives in China.”

Even so, in the midst of scraping one’s car clear of ice for the umpteenth time, it can be hard to believe that Spring and warmth will ever come again – much less that, on average, the world is actually getting warmer. After all, the local fishermen here in Woods Hole keep telling me they haven’t seen this much sea ice packing the harbor in twenty years.

Fortunately, the scientists at NASA have [put together a clear explanation](#) for why winter snowstorms don’t disprove climate change, and why these storms may *actually be evidence* of a warming planet.

First, even though small changes in temperature can have big effects (for example, by [changing the timing of Spring](#), [causing sea levels to rise](#), and [thawing permafrost](#)), they don’t instantaneously render wintry climates snow-free. For example, the average temperature in [parts of North Dakota in winter is 2°F](#). That’s thirty degrees below freezing. So, the North Dakotan climate would have to warm by 30°F for winter precipitation to fall as rain instead of snow.

Second, [overall warmer temperatures may actually intensify storm systems](#), resulting in more snowfall. That’s because the warmer the ocean and air are, the more water evaporates. More water vapor in the atmosphere means more condensation into clouds and, eventually, precipitation as rain or snow. So although we [don’t yet have enough data](#) to draw firm conclusions, Boston’s record-setting winter may actually be consistent with, rather than evidence contradicting, climate change.

In any case, last year's National Climate Assessment concluded that, on average, snow cover on the ground has declined over the last few decades. So, while Senator Inhofe may still be able to pick a snowball fight periodically, his chances are getting more and more limited.

Armed with this scientific explanation, I usually feel prepared to confront the Senator Inhofes of the world. But I've found that this feeling lasts only so long as I'm not personally face to face with them.

Earlier this month, while defrosting during a week-long visit to California, I shared an [Uber](#) ride with three San Francisco Bay Area residents. I mentioned that I was in town from the Boston area, and the conversation turned to winter weather. It quickly became clear that two people – the car's driver, and the gentleman beside me in the back seat – were climate change deniers, brimming over with facts and statistics to support their view. My third companion, in contrast, appeared to share the scientific consensus. Yet neither he nor I, once we'd established everyone's contradictory views, chose to engage in a heated debate during our twenty-minute car ride.

Why not?

I can answer only for myself. As the youngest person in a car full of strangers, I felt compelled to observe a social contract of politeness. I also felt sure that I wouldn't change anyone's mind in twenty minutes, given the level of dogmatism already on display.

But maybe I was wrong. I've fretted over that many times since the car ride, running alternate scenarios through my head during quiet moments in the day. Today, I've written this piece, as a sort of script for what I could have said.

If I can admire Senator Inhofe for one thing, it's this: He's unafraid to throw down the gauntlet (or the snowball, as the case may be). And his showmanship, like Boston's winter, gives the rest of us a talking point, a lead into what could be a challenging conversation.

No, perhaps those conversations don't belong in an Uber. But they do belong at the dinner table with friends, by the water cooler with colleagues, or on the phone with relatives. I've found they work best when they happen between people who already know and respect one another and are, therefore, somewhat more willing to listen.

It's these conversations that move past the dogma and dramatics, reaching people at their most rational, building consensus, and moving forward.

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