

Why the winter weather in a warming climate?

I've been waiting to hear it... "How can you say there's global warming when we've had a winter like this?!" It's a tempting thought while shoveling huge mounds of the white stuff, but it's important to keep the winter weather in perspective. We need to keep an eye on the big picture, understanding the difference between "weather" and "climate," and realizing that there are natural cycles that can cause variation from year to year within the overall warming trend.

The National Oceanic and Atmospheric Administration (NOAA) explains the difference between weather and climate like this: weather is "the state of the atmosphere with respect to wind, temperature, cloudiness, moisture, pressure, etc...*at a given point in time,*" whereas "climate" is "the composite or generally prevailing weather conditions of a region, throughout the year, *averaged over a series of years.*" One cold winter in the Midwest does not a cooling-trend make. However, Earth's top ten warmest years since 1850 all occurring within the last eleven years does indicate that the climate is warming.

If you look at the charts of global temperatures on the NOAA or NASA websites for any particular month, you may be struck by how the Midwest can be having a colder than average month while the Southeast or Northeast is having a warmer than average month. This was true for February, 2008. If you look at the averaged temperature for the entire United States for the month of February, you will find that the temperature was close to (but slightly above) the historical average. Of course, in comparison to recent years, "average" can seem quite cold.

What we've experienced here this winter is actually exactly what was predicted last August. Doug M. Smith, et al, in their article "Improved Surface Temperature Prediction for the Coming Decade from a Global Climate Model" published in the August issue of *Science*, have refined the climate models for the next decade:

"Our system predicts that internal variability will partially offset the anthropogenic global warming signal for the next few years...However, climate will continue to warm, with at least half of the years after 2009 [through 2014] predicted to exceed the warmest year currently on record."

In plain English – don't pack away your shorts; it'll cool off for a year or two, but then be hotter than ever. But why the cool-off?

The key, they found, was to factor current short-term information about the El Nino / La Nina cycles into the long-term climate models. Look back at 1998, for example; it was the second warmest year on record for the planet as a whole. It was also the winter that a strong El Nino, or warm Pacific Ocean current, developed. It's a little more complicated than this, as each of these phenomena may affect the other, and solar radiation also plays a small role, but for simplicity's sake, imagine two line graphs: the first, representing the global warming trend due to increasing green house gases in the atmosphere, rises steadily. The second, representing El Nino/La Nina patterns, rises and falls over time. You can imagine, when both graphs are rising at the same time, the result would be a very warm year. This is what occurred in 1998.

But sometimes the lines on the graph are going in opposite directions. This winter, a strong La Nina, or cold Pacific ocean current, developed, which is dampening the effect of the upward trend in temperatures due to greenhouse gases in the atmosphere – leading to a cool, wet February in the Midwest, closer to the historical average (but still warmer than average for the U.S.; and December and January were in the top ten warmest on record, globally). Even so, our February and March weather was hardly ordinary. Global warming increases the amount of moisture in the air, and thus the record snowfalls. It also intensifies storms; did you notice the thunderstorm during our recent blizzard? That was warm and cold air colliding. And while we were mid-blizzard, the south was experiencing unusual winter tornadoes...

La Nina will keep things relatively cool and wet for awhile yet, however in a year or so the El Nino current will likely be back. Add to this the global warming trend, and we'll be breaking records for warmest years again. So let's not allow today's weather to distract us from the work that needs to be done to slow the rate of climate change over the decades to come. As I tell my children, keep this winter in your memory – it's an increasingly rare reminder of what an average winter in Ohio used to be.

Check it out:

El Nino / La Nina information from National Oceanic and Atmospheric Administration:
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle/nawinter.shtml

2008 weather from National Oceanic and Atmospheric Administration:
<http://www.ncdc.noaa.gov/oa/climate/research/2008/feb/currentmonth.html>

James Hansen of NASA's take on the cold weather of 2008:
http://www.columbia.edu/~7Ejeh1/mailings/20080303_ColdWeather.pdf

BBC story on article: "Improved Surface Temperature Prediction for the Coming Decade from a Global Climate Model." Doug M. Smith, et al. August 10, 2007, SCIENCE:
<http://news.bbc.co.uk/2/hi/science/nature/6939347.stm>

An explanation by climate scientists of El Nino and 2007's warm winter:
<http://www.realclimate.org/index.php/archives/2007/01/el-nino-global-warming-and-anomalous-winter-warmth/>