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Is Global Warming Responsible for Wild Weather?
Yes it is—but not as much as you might think.
by Noreen MaloneNovember 09, 2010

This has been a year of unusual weather worldwide. In Brooklyn, residents were surprised by what seemed to be a tornado in September. That came on the heels of a 2007 tornado in the borough—the first in more than a century. Last winter, much of the northern hemisphere experienced record cold temperatures and heavy snowfalls, while the southern hemisphere had record heat. Seoul had its heaviest snowfall in recorded history; Australia, Pakistan, and Brazil experienced torrential rainfall that caused massive flooding; in Florida, the unusual winter freezes threatened citrus crops, and the summer of 2010 was a scorcher for much of the U.S. So is this due to global warming—or, as some have taken to calling it, "global weirding"?

Global warming, after all, isn't just about hotter summers. As the earth's temperatures rise, scientists speculate, there will be a lot more than warming going on. The change in ocean temperatures and sea levels will affect everything from rain patterns to wind direction. But how much of that is already happening, and how much is speculation?

Though we've seen increasingly unusual weather patterns in recent years, it's important to separate individual instances—or even seasons—of extreme weather from the broader category of climate change. Scientists say it's impossible to attribute one storm, even a massive one, to global warming; rather, they evaluate patterns over time to determine what's caused by manmade problems. Those heavy snows from last winter, according to researchers at Columbia University, were the result of two large colliding weather fronts—probably just a natural aberration, rather than necessarily a symptom of climate change. And that Brooklyn tornado was definitely bizarre—it occurred not only in a part

of the country not known for touchdowns, but also during an unusual time of day and season and in the midst of a regional drought. But it can't be precisely pinned on global warming.

Similarly, seasons that are particularly warm or cold are caused by off-kilter atmospheric patterns (for instance, last winter's record northern cold was attributed to an excess of cold air funneling up from the Arctic), but it's not until these patterns become a trend—occurring for more than a decade or more—that they're considered significant in terms of climate change. Such seasonal changes can move from being weather events to becoming climate-level shifts. Taken by themselves, those Pakistani floods can't be blamed on global warming—but as the climate heats up, it's more likely that precipitation will be heavy and possibly dangerous when the phenomenon does occur. (Researchers are already seeing heavier rains in India during monsoon season. The total rainfall has remained basically constant over the past 50 years. However, rain has become less frequent—but harder.)

Still, recent research has begun to show that at least in some cases, those altered and extreme weather patterns can be definitively linked to global warming. A just-released analysis by researchers at Duke University shows that's the case for summertime weather in the southeastern United States. Eleven of the past 30 summers were either abnormally wet or abnormally dry in the Southeastern states. And there were twice as many instances of "extreme" precipitation as there had been compared to the rainfall during the 30 preceding summers. Summer weather in that part of the country—along with that of the entire eastern U.S., Western Europe, and North Africa, is influenced by the North Atlantic subtropical high (NASH), a high-pressure system that has intensified an average of 0.9 geopotential meters every decade over the past 60 years.

In layman's terms, that means that the system extended higher and higher above sea level, making NASH more powerful. And its reach extended in other ways too; the area of the system grew, meaning that it came westward, closer to the eastern coast of the United States, and also increased its north-south movement. But slight shifts in NASH's path can have a big impact: If NASH goes slightly more northward than usual, it can make for a dry summer; southward, and the summer is an extremely wet one—for instance, those 11 abnormally wet or abnormally dry summers in the Southeast. Researchers at Duke say they thoroughly investigated naturally occurring phenomena for the growth of NASH, but found no plausible explanations. They concluded that the change is a result of alterations to the climate that were caused by humans.
Sum Total Being Green Isn't New

While the Duke team looked specifically at the Southeast, for the Pacific Ocean, researchers have noted that El Niño, the climate system that resurfaces every five years or so and is famous for bringing strong weather, has become both more frequent and stronger of late. Those changes match up with predictive climate-change models, so scientists suspect the change is anthropogenic, or caused by humans.

It's not just extreme weather that may be attributable to this "global weirding." One theory holds that decreased wind speeds in the U.S. could be linked to climate change. Another theory has suggested that warmer weather—a combination of longer summers and less snow in the winter—creates conditions for a longer growing seasons in the American West, and could mean, counterintuitively, that trees will take in less carbon dioxide, because precipitation from snow rather than rain is more effective in delivering moisture to these particular plants. Meanwhile, researchers at Yale have found that warmer temperatures in the upper Midwest could mean that toxic ticks will flourish and spread Lyme disease more readily there.

There also has been concern over a geographic spread or intensification of malaria as global warming occurs, since the disease is passed along more easily in extreme warmth. (Cases of malaria in such unlikely locales as Texas have some people particularly alarmed.) The (somewhat) good news on the disease, however, is that public-health efforts have thus far stopped the actual incidence of the disease from rising.

More dramatic are the claims that global warming could bring about or exacerbate civil wars in Africa. Conflicts on the continent are often are sparked by scarce agricultural resources, and have been more likely to occur in unusually warm years when those resources are made even more scarce. That may or may not come about, but the broader lesson seems to be that even if science hasn't yet formally connected all the dots on climate change, we should expect the unexpected.