

Researchers find links between Arctic melting and summer floods and fires

Lauren Morello, Environment and Energy Publishing, 10-11-12

A new weather pattern that sends blasts of warm southern air into the Arctic each June has fueled the recent, dramatic decline of the region's sea ice, according to a new government-funded study.

But that is not all it has done, the analysis suggests, linking the shifting summer winds to record thaws of the Greenland ice sheet, unusually wet European summers and Rocky Mountain wildfires.

Researchers say the switch from light, variable east-west winds to stronger, warmer blasts of southern air appears to have strengthened a climate feedback loop they call "Arctic amplification."

As the amount of ice that melts each summer increases, it opens larger and larger patches of dark Arctic Ocean waters that absorb more heat than the reflective ice they replace, a process that accelerates Arctic warming.

"The winds in the summer Arctic used to be light and variable," said the study's lead author, James Overland, a researcher at the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Laboratory who studies the Arctic climate. "Now the winds tend to set up blowing from the Bering Strait across the North Pole and out towards the North Atlantic."

That helps push ice out of Arctic waters. It also makes upper-level winds that normally blow from west to east wavier, wiggling farther north and south, a change that can wreak havoc on weather in Greenland and mid-latitudes in North America and Europe.

The new study suggests the phenomenon had a hand in the hot, dry conditions that helped spark record-breaking wildfires in the Rocky Mountains and a heat wave in Russia in June, and cool, wet summers in the United Kingdom since 2007 -- including record rains and floods that year and again this year.

Surprises for scientists

It is the latest surprise for researchers who study the Arctic, a region that is warming twice as fast as the global average.

Scientists were shocked in 2007 when Arctic sea ice cover dipped to a record low nearly 40 percent below the 1979-2000 average. But that historic melt season was bested this summer, when sea ice cover dipped an astonishing 16 percent below the 2007 mark.

"We're in a new normal for Arctic climate," said Overland, whose work was published yesterday in the journal *Geophysical Research Letters*. "We keep underestimating the importance of Arctic amplification -- that you have a little bit of global warming, but the special processes in the Arctic are accelerating the changes there. We really don't know how fast or where this is all going to go."

Another surprise, Overland said, is the link his study found between the blast of summer air flowing into the Arctic each June and persistent high-pressure weather systems that have produced unusual summer warmth in Greenland for the last six years.

chance that this will continue."

The effects of that warmer weather pattern were unusually dramatic this summer, as a series of strong high pressure ridges produced unusual surface thawing on the Greenland ice sheet and a record seasonal melt.

Greenland's largest thaw

Roughly 97 percent of the surface of Greenland's ice showed signs of thaw for a few days in mid-July, covering a larger area than any other melting event since satellite monitoring began 30 years ago, NASA said.

Researchers observed a similar but shorter event in late July. And few weeks later, on Aug. 8, Greenland set a new summer melt record, surpassing the 2010 mark with four weeks to go in the 2012 melt season.

Meanwhile, other recent studies have drawn connections between Arctic amplification and changes in the behavior of atmospheric circulation in fall and winter, fueling extreme weather like the powerful snowstorms that buried the U.S. East Coast in 2009-2010 and 2010-2011.

But predicting how those changes in atmospheric circulation will affect a specific area is difficult, Overland said.

"The normal jet stream weather is very chaotic, so it's virtually impossible to predict exactly where these droughts or added snowstorms would be in any particular year, including this upcoming winter," he said.

"But in the long term, we're down to 50 percent [Arctic sea] ice cover in the summer, compared to the long-term average. In another couple decades, we'll probably be down to 80 percent open water. As we move in that direction, you will increase the probability of these north-south linkages of climate and weather."