

Explainer: Topsy-turvy weather comes from polar vortex

February 17 2021, by Seth Borenstein



In this Feb. 11, 2021, photo, provided by Lars Rasmussen, dogs pull him on a sled in the eastern Greenland town of Tasiilaq. "The warm weather makes dog sledding and driving on snow scooters a bit of a hassle," Rasmussen said. (Lars Rasmussen via AP)

It's as if the world has been turned upside-down, or at least its weather.

You can blame the increasingly familiar polar vortex, which has brought a taste of the Arctic to places where winter often requires no more than a jacket.

Around the North Pole, winter's ultra-[cold air](#) is usually kept bottled up 15 to 30 miles high. That's the polar [vortex](#), which spins like a whirling top at the top of the planet. But occasionally something slams against the top, sending the cold air escaping from its Arctic home and heading south. It's been happening [more often](#), and scientists are still not completely sure why, but they suggest it's a mix of natural random weather and human-caused [climate change](#).

This particular polar vortex breakdown has been a whopper. Meteorologists call it one of the biggest, nastiest and longest-lasting ones they've seen, and they've been watching since [at least the 1950](#) s. This week's weather is part of a pattern stretching back to January.

"It's been a major breakdown," said Jennifer Francis, a climate scientist at the Woodwell Climate Research Center on Cape Cod. "It really is the cause of all of these crazy weather events in the Northern Hemisphere."

"It's been unusual for a few weeks now—very, very crazy," Francis said. "Totally topsy-turvy."



In this Feb. 15, 2021, file photo, snow blankets a neighborhood near the Mueller Development in Austin. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (Bronte Wittpenn/Austin American-Statesman via AP)

RECORD COLD IN WARMER PLACES

Record subzero temperatures in Texas and Oklahoma knocked millions off the power grid and into deep freezes. A deadly tornado hit North Carolina. Other parts of the South saw thunder snow and reports of something that seemed like a snow tornado but wasn't. Snow fell hard not just in Chicago, but in Greece and Turkey, where it's far less normal. Record cold also hit Europe this winter, earning the name the "Beast

from the East."

"We've had everything you could possibly think of in the past week," said Northern Illinois University meteorology professor Victor Gensini, noting that parts of the U.S. have been 50 degrees (28 degrees Celsius) colder than normal. "It's been a wild ride."

It was warmer Tuesday in parts of Greenland, Alaska, Norway and Sweden than in Texas and Oklahoma. And somehow people in South Florida have been complaining about record warmth that is causing plants to bloom early.



In this Feb. 15, 2021, file photo, icicles form on a citrus tree from a sprinkler system used to protect the trees from the freezing temperatures in Edinburg, Texas. There have been record subzero temperatures in Texas and Oklahoma,

and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (Delcia Lopez/The Monitor via AP)

In the eastern Greenland town of Tasiilaq, it's been about 18 degrees (10 degrees Celsius) warmer than normal, which "is a bit of a nuisance," said Lars Rasmussen, a museum curator at the local cultural center. "The [warm weather](#) makes dog sledding and driving on snow scooters a bit of a hassle."

Several meteorologists squarely blamed the polar vortex breakdown or disruption.

These used to happen once every other year or so, but [research](#) shows they are now close to happening yearly, if not more, said Judah Cohen, a winter storm expert for Atmospheric Environmental Research, a commercial firm outside of Boston.

THE SPINNING TOP GETS TOPPLED

The polar vortex spends winter in its normal place until an atmospheric wave—the type that brings weather patterns here and there—slams into it. Normally such waves don't do much to the strong vortex, but occasionally the wave has enough energy to push the spinning top over, and that's when the frigid air breaks loose, Gensini said.



A man walks at Filopapos hill as snow falls, with the ancient Acropolis hill and the Parthenon temple, in background, Athens, on Tuesday, Feb. 16, 2021. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (AP Photo/Petros Giannakouris)

Sometimes, the cold air mass splits into chunks—an event that usually is connected to big snowstorms in the U.S. East, like a few weeks ago. Other times, it just moves to a new place, which often means bitter cold in parts of Europe. This time it did both, Cohen said.

There was a split of the vortex in early January and another in mid-January. Then at the end of January came the displacement that caused cold air to spill into Europe and much of the United States, Cohen said.

Both Cohen and Francis said this should be considered not one but three polar vortex disruptions, though some scientists lump it all together.

While both the vortex and the wave that bumped it are natural, and polar vortex breakdowns happen naturally, there is likely an element of climate change at work, but it is not a sure thing that science agrees on, Cohen, Gensini and Francis said.



Ivan Gonzales, left, works with his brother-in-law Gabriel Martinez to assist a motorist using a carpet up a hill along the snow-covered Cherrywood Road in Austin, Texas, on Tuesday, Feb. 16, 2021. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (Bronte Wittpenn/Austin American-Statesman via AP)

Warming in the Arctic, with shrinking sea ice, is goosing the atmospheric wave in two places, giving it more energy when it strikes the polar vortex, making it more likely to disrupt the vortex, Cohen said.

"There is evidence that climate change can weaken the polar vortex, which allows more chances for frigid Arctic air to ooze into the Lower 48," said University of Georgia meteorology professor Marshall Shepherd.

PATTERN HAS BEEN OBSERVED FOR DECADES

There were strong polar vortex disruptions and cold outbreaks like this in the 1980s, Cohen said.

"I think it's historic and generational," Cohen said. "I don't think it's unprecedented. This Arctic outbreak has to be thought of in context. The globe is much warmer than it used to be."

It also feels colder because just before the outbreak, much of the United States was experiencing a milder-than-normal winter, with the ground not even frozen on Christmas Day in Chicago, Gensini said.



In this Feb. 15, 2021, file photo, a man snowboards down Congress Avenue after a heavy snow in Austin. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (Jay Janner /Austin American-Statesman via AP)

The globe as a whole is about the same temperature as the average was from 1979 to 2000 for this time of year, according to the University of Maine's [Climate Reanalyzer](#). That's still warmer than the 20th century average, and scientists don't think that this month has much of a chance to be colder than the 20th century average for the globe, something that hasn't happened since the early 1980s.

One reason is that it will soon warm back up to normal when the [polar vortex](#) returns to its regular home, Cohen said.



People stand near debris Tuesday, Feb. 16, 2021, in the Ocean Ridge Plantation area of Brunswick County, N.C., following a tornado. Record subzero temperatures in Texas and Oklahoma knocked millions off the power grid and into deep freezes. A deadly tornado hit North Carolina. It seems like the world's weather has turned upside-down. (Ken Blevins/The Star-News via AP)



People navigate snowy streets and sidewalks the morning after a snowstorm in the Chicago area, Tuesday, Feb. 16, 2021. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (AP Photo/Charles Rex Arbogast)



In this Feb. 15, 2021, file photo, an electronic message board advises drivers of potential congestion as they drive over snow on Interstate 55 in north Jackson, Miss. There have been record subzero temperatures in Texas and Oklahoma, and Greenland is warmer than normal. Snow fell in Greece and Turkey. Meteorologists blame the all-too-familiar polar vortex. (AP Photo/Rogelio V. Solis, File)

As for people thinking this cold outbreak disproves global warming, scientists say that's definitely not so.

Even with climate change, "we'll still have winter," said North Carolina state climatologist Kathie Dello. "What we're seeing here is we're pretty unprepared for almost every type of extreme weather. It's pretty sad."

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