News | Weather What is a polar vortex, the weather event causing winter storms in the US?

The expanding of the polar vortex – an area of cold air around the Arctic – southwards is causing cold spells in the US.



Sub-freezing temperatures can extend as far south as the Gulf Coast and Florida Peninsula in the US.

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The polar vortex spins anticlockwise around the North Pole with wind speeds of about

The tropospheric polar vortex occurs at the lowest layer of the atmosphere where most

155mph (250km/h).

By Al Jazeera Staff

6 Jan 2025

- events.

What is the polar vortex?

There are two types of polar vortexes – tropospheric and stratospheric.

weather phenomena take place. The vortex creates milder weather across northern latitudes.

The Arctic polar vortex is a band of strong westerly winds that forms in the

Further south, When the polar vortex is strong Every other year the polar vortex dramatically weakens and can be and stable the jet stream stays further north, keeping the cold air pushed off the pole. This pushes cold air southwards and warm air contained over the Arctic and the mid lattitudes warmer than usual northwards into the Arctic. © 0 0 0 Source: National Oceanic and Atmospheric Administration

typically occurs about 10-30 miles (16-48km) above the Earth's surface and forms in

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When the stratospheric polar vortex is in a stable state, frigid arctic air is confined to

But when it is in a weakened state, the chilly winds expand beyond its circular North

autumn but disappears in the spring of each year.

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The rising warm air from the lower atmosphere weakens the polar vortex, allowing it to spread more widely. This upward movement of warm air can be triggered by significant weather patterns or phenomena, such as powerful winds in mountainous regions or

Both types of polar vortexes are important for global atmospheric circulation and cli-

Do we experience cold polar vortexes all the time? The extreme cold temperatures from a weakened polar vortex, although seasonal and cyclical in nature, are not an annual phenomenon. Indeed, the term polar vortex did not become a popular public term until 2014. The 2013-14 polar vortex resulted in record-shattering cold and snowfall which swept across Canada and the eastern US, plunging the regions into one of their coldest win-

CLIMATE Polar vortexes are not new The polar vortex expands fairly regularly during winter. However, as Google Trends

Polar vortex trending in 2014

shows, the term "polar vortex" didn't become widely known until 2014.

Major metropolitan areas, including New York, Philadelphia, and Chicago, were blan-

keted with snow, with accumulations ranking among the top 10 highest in their record-

80 70 60 50 40 30 10 2006 2004 2020 2008 2010 2012 2014 2016 2018 2022 2024 * In Google, this is relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. © 0 0 0 Source: Google Trends @AJLabs ALJAZEERA January 6, 2025 (Al Jazeera) According to an article published by NASA in 2015, the 2013-14 polar vortex resulted in 92.5 percent of the Great Lakes being covered in ice, the second most extensive ice cover observed via satellite. Lake Michigan's surface froze to an unprecedented 93.3 percent on March 8, 2014, marking the highest ice coverage ever recorded for this Great Lake. Advertisement Slip a Marble into Your Jar of **Peanut Butter** Life Hack: "Here's what happens when you slip a marble into your jar of peanut butter."

Global warming makes the polar vortex weaker because the Earth is not heating up the same everywhere. The North Pole is warming faster than other places, which weakens the polar vortex and the jet stream – a fast-flowing air current in the atmosphere. This makes it easier for the vortex to get knocked out of place and bring colder air down to many regions, including Europe and North Asia. "The change is warming higher latitudes and reducing the temperature difference be-

tween the warmer mid-latitude and polar regions. This weakens and destabilises the

polar jet stream, causing it to dip into lower latitudes, bringing polar air farther south,"

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Paul Ullrich, an associate professor of regional climate modelling at the University of

Does climate change affect the polar vortex?

ogy Undergraduate Program at Rutgers University, said last February.

climate change may be affecting the polar vortex.

California, Davis, wrote in a 2021 article.

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From: The Take

Researchers have been trying to understand the effect of climate change on the intensi-

ty or frequency of colder temperatures due to the polar vortex. Some data suggests that

"It makes sense that the polar vortex tends not to be as strong due to global warming

because the planet isn't warming uniformly. It's warming more at the pole, overall de-

creasing the strength of the polar vortex and the jet stream and making it more suscep-

tible to being dislodged and sent our way," Steven Decker, the director of the Meteorol-

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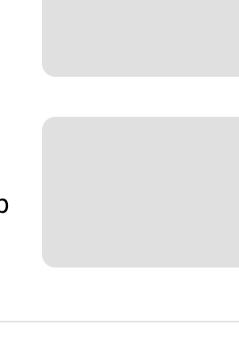
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CLIMATE What is the polar vortex? stratosphere between about 16 km (10 miles) and 48 km (30 miles) above the North Pole every winter. The winds enclose a large pool of extremely cold air. Stable polar vortex Distrupted polar vortex Polar jet Weak Polar stream iet stream Cold air moves south Cold air contained Warm air moves north

@AJLabs ALJAZEERA The polar vortex we are currently experiencing is a stratospheric polar vortex which

The United States has been experiencing severe winter storms, which is likely to affect more than 60 million people in the country's east. The ongoing cold spell, which may bring down the mercury to as low as -50C (-60F), is caused by the expansion of the polar vortex – an area of extremely cold, rotating air around the Arctic – southwards. · Photos: Death toll in deadly flooding, landslides in Indonesia rises Photos: New wildfire breaks out north of Los Angeles The polar vortex primarily affects countries situated in the Northern Hemisphere's mid to high latitudes. These regions are particularly susceptible to extreme cold weather

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Get Consumer Choice In 2014, many news outlets and weather reports extensively discussed this atmospheric pattern, making it a household name. The extreme cold not only captured public attention but also provided a widely accessible explanation for the severe weather conditions, cementing the polar vortex within the cultural zeitgeist as a key factor in understanding winter weather patterns in the Northern Hemisphere.

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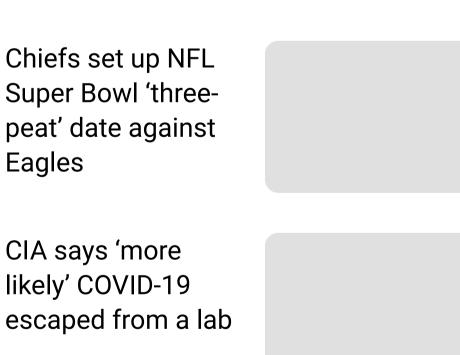
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