

# ARCTIC ICE MELT IS DISRUPTING KEY OCEAN CURRENT, MAY ALTER CLIMATE IN WESTERN EUROPE: STUDY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Heating up: A file photo of melt ponds on the Arctic sea ice. | Photo Credit: [STEFAN HENDRICKS](#)

Researchers have unravelled how an ocean water current, which plays a key role in keeping Western Europe warm, could be altered by an influx of unprecedented amounts of cold, fresh water from melting ice in the Arctic.

According to the scientists, including those from NASA's Jet Propulsion Laboratory in the US, a seawater current called the Beaufort Gyre keeps the polar environment in balance by storing fresh water near the surface of the Arctic ocean.

Wind blows the gyre in a clockwise direction around the western Arctic Ocean, north of Canada, where it naturally collects fresh water from the melting of glaciers, and river runoff, the study, published in the journal *Nature Communications*, noted.

The researchers said this fresh water is important in the Arctic since it floats above the warmer, salty water, and helps protect the sea ice from melting - in turn regulating the Earth's climate.

As the fresh water is slowly released by the gyre into the Atlantic Ocean over a period of decades, it allows the Atlantic Ocean currents to carry it away in small amounts.

However, since the 1990s, the researchers said, the gyre has accumulated a large amount of fresh water - 8,000 cubic kilometres - or almost twice the volume of Lake Michigan in the US.

According to the new study, the cause of this gain in freshwater concentration is the loss of sea ice in summer and autumn.

Due to this decades-long decline of the Arctic's summertime ice cover, the Beaufort Gyre is more exposed to the wind, which has spun the gyre faster, trapping the fresh water in its current, the scientists noted.

The westerly winds have also persistently dragged the current in one direction for over 20 years, increasing its speed and size, as well as preventing the fresh water from leaving the Arctic Ocean, they said.

Where the winds used to change direction every five to seven years, this decades-long western wind is unusual for the region, the study noted.

If the wind changes direction again, the scientists said, it could reverse the current, pulling it counterclockwise and releasing the water it has accumulated all at once.

"If the Beaufort Gyre were to release the excess fresh water into the Atlantic Ocean, it could potentially slow down its circulation. And that would have hemisphere-wide implications for the climate, especially in Western Europe," said Tom Armitage, lead author of the study from

NASA's Jet Propulsion Laboratory.

The release of fresh water from the Arctic Ocean to the North Atlantic can change the density of surface waters, the study warned.

Water from the Arctic loses heat and moisture to the atmosphere, and sinks to the bottom of the ocean, where it drives water from the north Atlantic Ocean down to the tropics in a conveyor-belt-like current called the Atlantic Meridional Overturning Circulation, the scientists explained.

This current helps regulate the planet's climate by carrying heat from the tropically-warmed water to northern latitudes like Europe and North America, and if it is slowed down, it could negatively impact all life forms, especially marine creatures, the study noted.

"We don't expect a shutting down of the Gulf Stream, but we do expect impacts. That's why we're monitoring the Beaufort Gyre so closely," said Alek Petty, a co-author of the study from NASA's Goddard Space Flight Center in the US.

The study also found that, although the Beaufort Gyre is out of balance due to the added energy from the wind, it expels that excess energy by forming small, circular eddies of water.

While the increased turbulence has helped keep the system balanced, it may also lead to further ice melt since it mixes layers of cold, fresh water with relatively warm, salt water below.

This could, in turn, lead to changes in how nutrients and organic material in the ocean are mixed, significantly affecting the food chain and wildlife in the Arctic, the researchers explained.

"What this study is showing is that the loss of sea ice has really important impacts on our climate system that we're only just discovering," said Petty.

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