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By Robert Marsh
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Atlantic circulation in danger of collapsing

Sources: South Wind

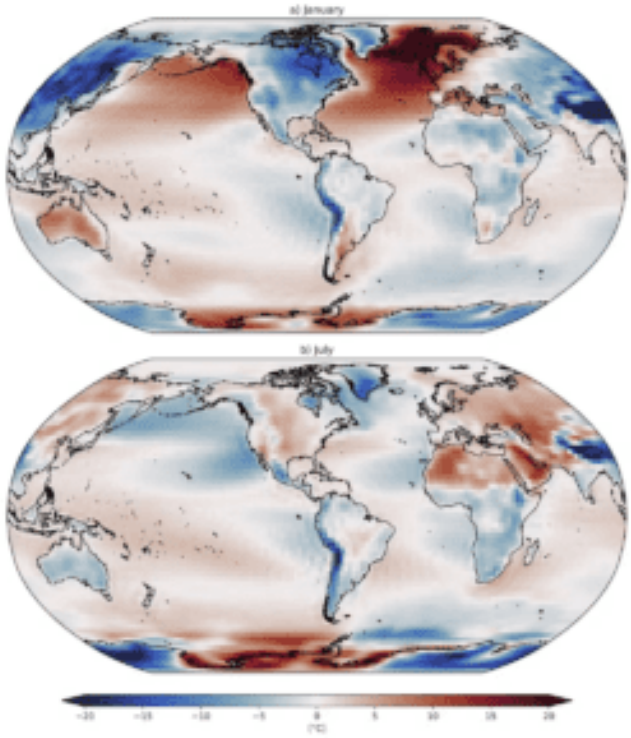
Among reports of deadly heat waves across the northern hemisphere is the grim prospect of a climate catastrophe on a much larger scale. New findings published in Nature Communications point to a possible collapse, in the coming decades, or perhaps even in the next few years, of the Atlantic meridional overturning circulation (Amoc). This would take the European climate to even more dramatic extremes.

The Amoc is a system of currents in the Atlantic Ocean that carry warm water north, where it cools and submerges. It is a crucial factor that explains why Europe's climate has been stable for thousands of years, although this year's chaotic summer can hardly be considered an example of such stability.

There is a lot of uncertainty in these latest predictions and some scientists are less convinced that collapse is imminent. In addition, the Amoc is only one part of the broader Gulf Stream system, mostly driven by winds that will continue to blow even if the Amoc collapses. Thus, a part of the Gulf Stream will survive the collapse of the Amoc. However, I have been studying the relationship between Atlantic currents and climate for decades and I know that the collapse of the AMOC would lead to greater climate chaos across Europe and beyond. In any case, this is a risk worth being aware of.

Amoc helps keep Europe warm and stable

To appreciate the extent to which the Amoc influences the climate of the north-east Atlantic, let's look at how the population of northern Europe enjoys warmer temperatures than those of similar latitudes on other continents. The following maps show how surface air temperatures differ from the average for each latitude and draw warm and cold zones across the planet:



[a) January, b) July

The most amazing thing about the northern reverse (January) is the great red spot centered west of Norway, where temperatures are 20 °C warmer than the average of the latitude, and that thanks to the Amoc. The northeastern Pacific – and thus western Canada and Alaska – enjoys a more modest warming of 10°C thanks to a similar current, while

prevailing westerly winds make the Northwest Atlantic and Pacific Northwest much cooler, as do the adjacent land masses of eastern Canada and Siberia.

The weather and climate of Europe, and Northern Europe in particular, is highly variable from day to day, week to week and year to year, with opposing air masses (warm and humid, cold and dry, etc.) gaining or losing influence, often guided by the high-altitude jet stream. Events that occur far away, above the ocean, can cause changes in weather and climate.

How ocean temperatures relate to weather

In recent years, Europe has experienced some particularly unusual weather in both winter and summer. At the same time, peculiar sea surface temperature patterns have been measured across the North Atlantic. In wide swaths of the ocean, from the tropics to the Arctic, temperatures have persistently remained 1 to 2°C above or below normal levels, for months or even years. It appears that these patterns exert a great influence on the atmosphere, including the trajectory and strength of the jet stream.

To some extent we can attribute some of these ocean surface temperature patterns to the change in the Amoc, but in many cases the link is not so direct. However, the association of extreme weather seasons and times with unusual ocean temperatures can give us insight into how a collapsed AMOC could alter the *status quo*. Here are three examples.

Northern Europe had successive severe winters in 2009/2010 and 2010/2011, subsequently attributed to a brief slowdown in the Amoc. At the same time, the heat had increased in the tropics, leading to an unusually active hurricane season between June and November 2010.

In the mid-2010s a *cold drop* formed in the North Atlantic, which peaked in the summer of 2015 as it coincided with heat waves in central Europe and was one of the few areas of the world colder than its long-term average. The cold drop appeared suspiciously as the fingerprint of a weakened AMOC, but some colleagues and I later attributed this passing episode to more local atmospheric influences.

In 2017, the tropical Atlantic was again warmer than average and once again followed by an unusually active hurricane season, although the AMOC did not seem as clearly involved as in 2010. Perhaps extensive northeastern heat in late 2017 could sustain Hurricane Ophelia, which formed around the Azores and made landfall in Ireland in October.

Based on these three examples, it is feared that a more substantial change in North Atlantic surface temperatures will have profound consequences for the climate in Europe

and beyond. Wider ocean temperature extremes can disrupt weather systems that rely on heat and moisture from the sea: when and where temperatures rise above normal extremes, Atlantic storms can become more destructive. More extreme ocean temperature patterns can influence hurricane tracks and the jet stream, driving storms to increasingly unlikely destinations.

If the Amoc collapses, we can foresee greater extremes of heat, cold, drought and flooding, a series of *surprises* that will exacerbate the current climate emergency. The potential impacts on the climate – especially in Europe – require even more urgent decisions.

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Translation: **south *wind***

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Source: https://vientosur.info/la-circulacion-atlantica-esta-en-peligro-de-colapsar-agravando-el-caos-climatico-en-toda-europa/

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