# New research suggests AMOC likely to survive this century but may weaken significantly



A recent study published in the journal Nature has provided new insights into the potential future of the Atlantic Meridional Overturning Circulation (AMOC), a crucial component of global weather systems. Researchers from the UK’s Met Office and the University of Exeter analysed simulations from 34 different climate models to assess whether the AMOC is likely to collapse within this century. Their findings indicate that a complete shutdown of this ocean current system is unlikely to occur before 2100.

The AMOC plays a vital role in regulating climate by transporting warm water northward and cooler water southward. Concerns have mounted in recent years regarding a possible weakening of this current due to climate change, which could lead to unpredictable weather patterns, cooler conditions in Europe, and rising sea levels along the eastern coast of the United States. This scenario echoes the premise of the 2004 disaster movie "The Day After Tomorrow," which dramatizes the catastrophic impacts of such a climate crisis.

Lead author Jonathan Baker, an oceanographer at the Met Office, explained the implications of their findings, stating that while no simulations predict a total shutdown of the AMOC before the end of the century, it may still weaken significantly. “This should be reassuring for people,” he said. However, he cautioned against complacency, asserting, "The AMOC is very likely to weaken this century and that brings its own major climate impacts."

The AMOC functions based on a principle where warm water cools as it reaches the Arctic, forming sea ice, which increases salinity and density, causing the water to sink and flow south. The ongoing effects of climate change, including the influx of fresh water from melting glaciers in Greenland, have raised questions about the current's stability. Previous studies suggested that the AMOC could completely cease operations in a matter of decades, but Baker’s research indicates that natural mechanisms may allow it to continue functioning, albeit in a weakened state.

Baker pointed out that as the AMOC weakens, a secondary mechanism could emerge in the Southern Ocean surrounding Antarctica, where upwelling could help sustain the system’s operation. “The Southern Ocean winds act like a powerful pump that keeps the AMOC running even in extreme climate change scenarios,” he said.

While the research suggests that a total collapse is not immediate, it does not eliminate the significant impacts that could arise from a weakened AMOC. Consequences could include changes in agricultural productivity and disruptions to fish stocks. The current strength of the AMOC is measured in a unit called Sverdrups, with recent figures indicating it is now around 17 Sverdrups, a decrease from approximately 19 Sverdrups in 2004.

Discussions among scientists regarding the definition of an AMOC "shutdown" have emerged, with Baker defining it as a reduction to zero Sverdrups. However, others in the scientific community, such as Levke Caesar and Stefan Rahmstorf from the Potsdam Institute for Climate Research, argue that even a reduction to about 5 Sverdrups could still be considered a significant weakening with profound consequences. Caesar noted that “such a strong AMOC weakening comes with a lot (of) impacts,” highlighting the nuanced understanding of this critical climate system.

As the field continues to evolve, researchers remain vigilant in monitoring the AMOC, acknowledging that while absolute collapse may not be imminent, significant changes are still anticipated by the end of the century.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://www.sciencemediacentre.org/expert-reaction-to-paper-warning-of-a-collapse-of-the-atlantic-meridional-overturning-circulation/> - This URL supports the discussion on the potential collapse of the AMOC and its climate implications, highlighting the importance of continued monitoring and the potential for significant impacts even if a full collapse does not occur.
* <https://www.cbc.ca/news/science/amoc-study-1.7469051> - This article corroborates the findings that a complete shutdown of the AMOC is unlikely before 2100 and discusses the potential weakening of the current and its impacts on climate and ecosystems.
* <https://www.science.org/doi/10.1126/sciadv.adk1189> - This study provides insights into the AMOC's potential tipping point, using physics-based early warning signals to assess its stability under climate change scenarios.
* <https://www.nature.com/articles/s43016-019-0011-3> - This article discusses the potential impacts of an AMOC collapse on climate, including effects on arable farming and water resources in regions like the UK.
* <https://www.oecd.org/environment/climate-tipping-points-abc5a69e-en.htm> - This OECD report highlights climate tipping points, including the AMOC, and discusses potential impacts on global food production and ecosystems.