**News release, January 31, 2019**

**Waters west of Europe are key to regulating climate**

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A new international study finds that the Atlantic meridional overturning circulation (AMOC), a deep-ocean process that plays a key role in regulating Earth’s climate, is primarily driven by cooling waters west of Europe.

In a departure from the prevailing scientific view, the study shows that most of the overturning and variability is occurring not in the Labrador Sea off Canada, as past modelling studies have suggested, but in regions between Greenland and Scotland. There, warm, salty, shallow waters carried northward from the tropics by currents and wind, sink and convert into colder, fresher, deep waters moving southward through the Irminger and Iceland basins.

Overturning variability in this eastern section of the ocean was seven times greater than in the Labrador Sea, and it accounted for 88 percent of the total variance documented across the entire North Atlantic over the 21-month study period.

The study, which was led by Susan Lozier, the Ronie-Rochele Garcia-Johnson Professor of Earth and Ocean Sciences at Duke University’s Nicholas School of the Environment, involved scientists on the EU-funded Blue-Action project, which aims to better predict weather and climate across the northern hemisphere.

“Overturning carries vast amounts of anthropogenic carbon deep into the ocean, helping to slow global warming,” said co-author Dr Penny Holliday of the UK’s National Oceanography Centre. “The largest reservoir of this anthropogenic carbon is in the North Atlantic.”

“Overturning also transports tropical heat northward,” Dr Holliday said, “meaning any changes to it could have an impact on glaciers and Arctic sea ice. Understanding what is happening, and what may happen in the years to come, is vital.”

Scientists from 16 research institutions from seven countries collaborated on the new study. They published their peer-reviewed findings on February 1 in Science.

"As scientists, it is exciting to learn that there are more pieces to the overturning puzzle than we first thought," said co-author Dr Johannes Karstensen of the GEOMAR Helmholtz Centre for Ocean Research Kiel, in Germany.

"Though the overturning in the Labrador Sea is smaller than we expected, we have learned that this basin plays a large role in transporting freshwater from the Arctic,” Dr Karstensen said. “Continued measurements in that basin will be increasingly important,” as the Arctic changes unexpectedly.

Another co-author and Blue-Action partner, Prof Stuart Cunningham of the Scottish Association for Marine Science (SAMS), said: “These results are a fundamental step change in our ability to continuously observe the ocean circulation that is so important for European climate and ultimately help inform societal decisions on how we deal with the effects of climate change.

The paper, *A Sea Change in Our View of Overturning – First Results from the Overturning in the Subpolar North Atlantic Program* has come from the OSNAP project. Primary funding for the research came from the U.S. National Science Foundation’s Physical Oceanography Program and the United Kingdom’s Natural Environment Research Council. Additional funding came from the European Union 7th Framework Programme and Horizon 2020.

CITATION: “A Sea Change in Our View of Overturning – First Results from the Overturning in the Subpolar North Atlantic Program,” M.S. Lozier, F. Li, S. Bacon, F. Bahr, A.S. Bower, S.A. Cunningham, M.F. de Jong, L. de Steur, B. DeYoung, J. Fischer, S.F. Gary, N.J.W. Greenan, N.P. Holliday, A. Houk, L. Houpert, M.E. Inall, W.E. Johns, H.L. Johnson, C. Johnson, J. Karstensen, G. Koman, I.A. LeBras, X. Lin, N. Mackay, D.P. Marshall, H. Mercier, M. Oltmanns, R.S. Pickart, A.L. Ramsey, D. Rayner, F. Straneo, V. Thierry, D.J. Torres, R.G. Williams, C. Wilson, J. Yang, I. Yashayaev and J. Zhao. Science, Feb. 1, 2019. DOI: 10.1126/science.aau6592

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**Images**

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**Notes to editors:**

* Note to Editors: Susan Lozier is available for additional comment at (919) 681-8199 or [mslozier@duke.edu](mailto:mslozier@duke.edu). A video interview with Lozier that includes animations of ocean currents may be seen on YouTube - <https://www.youtube.com/watch?v=hjGzY74AsJw>
* *Blue-Action* is a four-year research and innovations project funded by the European Union’s Horizon 2020 programme with €7.5 million investment. It brings together 116 experts from 40 organisations in 17 countries on three continents working in academia, local authorities and maritime industries. The project aims to model and predict the weather and climate on seasonal to decadal time scales in the Arctic and over the northern hemisphere. This information will allow communities and businesses in Eurasia and North America to develop and plan their activities better.