ID: W2511074740

TITLE: Overturning in the Subpolar North Atlantic Program: A New International Ocean Observing System

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ABSTRACT:

Abstract For decades oceanographers have understood the Atlantic meridional overturning circulation (AMOC) to be primarily driven by changes in the production of deep-water formation in the subpolar and subarctic North Atlantic. Indeed, current Intergovernmental Panel on Climate Change (IPCC) projections of an AMOC slowdown in the twenty-first century based on climate models are attributed to the inhibition of deep convection in the North Atlantic. However, observational evidence for this linkage has been elusive: there has been no clear demonstration of AMOC variability in response to changes in deep-water formation. The motivation for understanding this linkage is compelling, since the overturning circulation has been shown to sequester heat and anthropogenic carbon in the deep ocean. Furthermore, AMOC variability is expected to impact this sequestration as well as have consequences for regional and global climates through its effect on the poleward transport of warm water. Motivated by the need for a mechanistic understanding of the AMOC, an international community has assembled an observing system, Overturning in the Subpolar North Atlantic Program (OSNAP), to provide a continuous record of the transbasin fluxes of heat, mass, and freshwater, and to link that record to convective activity and water mass transformation at high latitudes. OSNAP, in conjunction with the Rapid Climate Change?Meridional Overturning Circulation and Heatflux Array (RAPID?MOCHA) at 26°N and other observational elements, will provide a comprehensive measure of the three-dimensional AMOC and an understanding of what drives its variability. The OSNAP observing system was fully deployed in the summer of 2014, and the first OSNAP data products are expected in the fall of 2017.

SOURCE: Bulletin of the American Meteorological Society

PDF URL: None

CITED BY COUNT: 169

PUBLICATION YEAR: 2017

TYPE: article

CONCEPTS: ['North Atlantic Deep Water', 'Oceanography', 'Thermohaline circulation', 'Climatology', 'Water mass', 'Climate change', 'Shutdown of thermohaline circulation', 'Gulf Stream', 'Ocean current', 'Environmental science', 'Geology']