Overturning in the Subpolar North Atlantic: What we have learned to date and what we have yet to learn

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The Overturning in the Subpolar North Atlantic Program (OSNAP) is a partnership among oceanographers from the US, UK, Germany, the Netherlands and Canada, whose goal is to measure and understand what drives the Atlantic Meridional Overturning Circulation (AMOC) and its variability. The OSNAP observing system, in place since 2014, provides a continuous record of the full-water column, trans-basin fluxes of heat, mass and freshwater in the subpolar North Atlantic. The first six-years of this time series have revealed surprising results on the mean and variability of the overturning circulation in the subpolar North Atlantic and have shed light on the AMOC forcing mechanisms on seasonal and interannual time scales. Additionally, the six-year time series of the meridional heat and freshwater fluxes reveal the complicated roles that both overturning and gyre dynamics play in the distribution of heat and freshwater across this basin. In my talk I will review the contributions that OSNAP has made to date to our understanding of the MOC, MHT and MFT in the subpolar North Atlantic and place them in the context of recent modeling studies and other relevant observational studies. Finally, I will address outstanding questions as they relate to the meridional overturning circulation in the North Atlantic.