

The Bremen NOAC Observation System in the Subpolar North Atlantic

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The Bremen "North Atlantic Changes" (NOAC) observation system is installed along key sections of the western subpolar North Atlantic. As part of NOAC deep-sea moorings and inverted echo-sounders equipped with pressure sensors (PIES) are put into a ship-based framework consisting of repeated large-scale hydrographic surveys and tracer measurements. The overall goal is to determine and analyze variations in the main components of the oceanic circulation in the western subpolar North Atlantic. Focus is on the import and lateral distribution of subtropical waters carried across 47°N to higher latitudes by the North Atlantic Current (NAC) and on the formation and respective changes of different components of Labrador Sea Water (LSW) as seen in the hydrographic and tracer data. We furthermore study the high-latitude export of subpolar and subtropical waters across the Mid-Atlantic Ridge (MAR) into the eastern North Atlantic as well as the export of deep water components in the Newfoundland Basin across 47°N towards the south.

Here, we report on our recent results stemming from the PIES- and mooring-related efforts starting in 2006 and 2009, respectively, that reveal the strength and major circulation pathways of the subpolar gyre in the Newfoundland Basin and at the MAR. Furthermore, we present changes in the tracer inventories and tracer-based finger prints that result from recent variations in the formation of LSW having an impact on the storage ability of the subpolar North Atlantic with respect to anthropogenic carbon.