



Transport and pathways of the subpolar gyre inferred by integral methods

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The Subpolar Gyre of the North Atlantic Ocean is a crucial component for the climate relevant oceanic circulation. Warm and saline water from the subtropics enter the subpolar and polar regions, and subsequently return as the deep and cold limb of the Atlantic Meridional Overturning Circulation (AMOC). Model simulations hint to a relation between deep water formation, the strength of the Subpolar Gyre and the intensity of the AMOC. To measure the variability of the NAC and thus the strength of the Subpolar Gyre, an array of 4 inverted echo sounders with bottom pressure sensors (PIES) was deployed along the Mid Atlantic Ridge between 47° and 53°N in August 2006. The location of the PIES allows the separation of the main NAC pathways through the fracture zones. The data were retrieved by acoustic telemetry in August 2008 and November 2009, while the array remained at the seafloor to complete its scheduled 5-year deployment period. The travel time measurements of the PIES are combined with hydrographic data from profiling Argo floats, and ship measurements to calculate time series of hydrographic properties and the transport variability relative to the reference level at 3400dbar. The horizontal bottom pressure differences are used to estimate the fluctuations at the reference level.