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Observing Interannual to Decadal Variability of Labrador Sea Outflow

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During the decade 1996-2008, several moored arrays were deployed over varying time intervals and positions along the western margin of the Labrador Sea. The main objective is the quantification of the water mass exports from the Labrador Sea through observation of currents (moorings, shipboard current measurements and floats) and water masses on time scales ranging from days to decades. During mooring deployments and recoveries, ship sections were occupied with CTD and ADCP/LADCP measurements, yielding transport estimates for the different layers of North Atlantic Deep Water (NADW). The western boundary transports in the Labrador Sea and their variability during 1997-99 were first presented by Fischer et al. (2004), who established the two-year mean section transports in the different isopycnal ranges of the DWBC at 53˚N and reported on intraseasonal variability of currents and transports. Recently, Dengler et al. (2006) evaluated the longer-term changes during 1996-2005 at the Labrador Sea Water level at 1500m depth and found interannual variability of the order of 10 to 20% of the mean flow at that level.
While a weakening of the formation of classical Labrador Sea Water was observed during the last decade, accompanied by a reduced vertical extent of the classical LSW, the shallower and lighter LSW constituent increased considerably. During this period the mid-depth temperatures increased by 0.05°C per year in the center of the Labrador Sea as well as in the boundary current; however, there is no indication of corresponding trends in the boundary current flow.
Here, the focus will be on a detailed investigation of the Deep Water export throughout the full depth range and near the exit of the Labrador Sea.