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Circulation and Deep Water export of the subpolar North Atlantic during the past decade

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The Deep Water circulation of the subpolar North Atlantic and the exchange with the subtropics across 43N is reviewed, based on observations and model/assimilation output fields. While altimetry and model studies have suggested a decline of the subpolar gyre circulation during the 1990s, the currents at the 1500m level along the western continental slope of the Labrador Sea show even a slight increase during 1996-2005; this contrast is investigated. Deep currents east of the Grand Banks do not confirm any MOC slowdown nor decadal trends during 1993-2005, and comparisons with model simulations are discussed. While prognostic models show a rather close relation between the decrease of Labrador convection since the early 90s and a subsequent decrease of the MOC rate by several Sv, this relation is not as obvious in the assimilations (ECCO and SODA-POP). The causes of this difference are investigated. At the shorter time scales, alongshore correlations and relations to local forcing are investigated, in search for evidence as suggested by models that indicate strong and well correlated boundary wave activity in response to upstream forcing changes.