



The Meridional Overturning Circulation and the Subpolar Gyre observed at the A25-OVIDE section in June 2002 and 2004

P. Lherminier (1), H. Mercier (1), T. Huck (1), C. Gourcuff (1), F. F. Perez (2), P. Morin (3), and C. Kermabon (1)
(1) Ifremer, LPO, Plouzane, France (pascale.lherminier@ifremer.fr, +33 2 9822 4496), (2) Instituto de Investigaciones
Marinas (CSIC), Vigo, Spain, (3) Adaptation et Diversité en Milieu Marin (UMR7144), Roscoff, France

The nature of the relation between the Subpolar Gyre full-depth circulation and the variability of the Meridional Overturning Cell will be addressed here by comparing two snapshots of the North Atlantic as delivered by two Greenland-Portugal hydrographic sections. The corresponding cruises were carried out in June-July 2002 and June-July 2004 on R/V Thalassa in the frame of the Ovide project. The absolute transports across the Ovide lines were estimated using a box inverse model constrained by the direct acoustic Doppler current profiler velocity measurements and by an overall mass balance across the section. Results of 2004 are presented, and then compared with 2002 transports. Although the main currents were significantly stronger in 2004, the Meridional Overturning Circulation, driven by the volume balance between the northward North Atlantic Current and the southward Western Boundary Current, did not change. The reason was found in a 6 Sv increase in the circulation of the first 1500 meters in the Subpolar Gyre, affecting mainly the circulation of the Western North Atlantic Central Water and the upper Labrador Sea Water, mostly in the lower limb of the MOC when calculated in density layers. A warm and salty water mass was advected into the Iceland Basin via the North Atlantic Current and recirculated into the Irminger Sea via the Irminger Current, changing the transport profile and the properties of Western Boundary Current. It was most likely advected into the Labrador Sea later on. Below, the Deep Western Boundary Current showed remarkably well mixed water masses in 2004, with a fresher Denmark Strait Overflow Water than in 2002.