



The 2002-2012 mean summer circulation across the Greenland-Portugal OVIDE hydrographic line

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The Greenland-Portugal OVIDE line is occupied every two other year since 2002. Each line consists of about 100 stations, which provide a high resolution mapping of hydrography and geochemistry. Previous studies have shown that the OVIDE line occupies a strategic place for the monitoring of the Atlantic meridional overturning circulation because most of the light to dense water conversion feeding the meridional overturning occurs north of the OVIDE line (Mercier et al., Progress in Oceanography, 2015).

The absolute geostrophic velocity across each line was estimated through an inverse model that combines the ship-mounted ADCP velocities with the thermal-wind velocities derived from hydrography and the Ekman velocities under an overall mass conservation constraint. The properties and absolute velocities of the 6 lines available between 2002 and 2012 were averaged and are used in the present study that focuses on the mean circulation across the OVIDE section.

The 2002-2012 mean meridional overturning circulation magnitude was estimated at 16 ± 2 Sv. The northward transport associated with the upper limb of the meridional circulation cell is mainly found between the subarctic front at 24.5W and the 20W meridian, within the core of the North Atlantic Current. The Irminger Current on the western flank of the Reykjanes Ridge and the branch of the North Atlantic Current locked at the Eriador Seamount to the north-west of the subarctic front are significant but secondary contributions. The main southward transports in the upper limb of the meridional overturning cell are associated with the upper part of the East Greenland Irminger Current at the Greenland Slope, two current veins on the eastern flank of the Reykjanes Ridge and the recirculation in the east European Basin. Hydrographic properties were used to identify connections between some of the northward and southward current branches. Turning to the lower limb of the Meridional Overturning Circulation, the southward flow on the eastern side of the Reykjanes Ridge consists of three different branches. In the Irminger Basin, the circulation is similar to that reported in previous studies.